the education of physicians for industry

- **UNDERGRADUATE**
- **POST GRADUATE**
- **GRADUATE**

Report of a Conference
held at
THE MELLON INSTITUTE
PITTSBURGH, DECEMBER 6-8, 1955
under the auspices of
National Fund for Medical Education

The Journal of
MEDICAL EDUCATION
March 1956 · Vol. 31, No. 2
In Two Parts – Part 2

The Journal of MEDICAL EDUCATION is owned and published monthly by the Association of American Medical Colleges, 185 N. Wabash Ave., Chicago 1, Ill.; Phone: STate 2-5870. Entered as second class matter January 17, 1930, at the Post Office, Chicago, Ill., under the Act of March 3, 1879.

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Printed in U.S.A.

Report of a Conference on the

Education of Physicians for Industry

The Mellon Institute for Industrial Research

Pittsburgh, Pa.

December 6-8, 1955

The Education of Physicians for Industry

Undergraduate • Postgraduate • Graduate

The Conference was jointly sponsored by:

ASSOCIATION OF AMERICAN MEDICAL COLLEGES

COUNCIL ON INDUSTRIAL HEALTH,
of American Medical Association

COUNCIL ON MEDICAL EDUCATION AND HOSPITALS
of American Medical Association

NATIONAL FUND FOR MEDICAL EDUCATION

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The conference on *The Education of Physicians for Industry* was sponsored by the National Fund for Medical Education, the Association of American Medical Colleges and the Councils on Industrial Health and on Medical Education and Hospitals of the American Medical Association.

The conference expenses and the costs of this report were generously underwritten by the United States Steel Foundation.

The Mellon Institute graciously made available its conference rooms and facilities.

Published as Part 2 of the Journal of Medical Education, March 1956.
Publication Office: Association of American Medical Colleges,
185 North Wabash Ave., Chicago 1, Ill.

Printed by Neely Printing Co., Chicago, Ill.

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ASSOCIATION OF AMERICAN MEDICAL COLLEGES

PUBLISHED FOR THE NATIONAL FUND FOR
MEDICAL EDUCATION

Preface

S. Sloan Colt

President, National Fund for Medical Education

ONE OF THE principal objectives of the National Fund for Medical Education is to encourage the development and advancement of continually improving standards of medical education with a view to strengthening the nation's ability to survive.

In carrying out this goal, the Fund has held a series of meetings throughout the country with leading medical educators, physicians in industry and the heads of important corporations. At one such meeting in February 1955, Dr. Ward Darley, president of the University of Colorado, proposed that a conference be held to explore thoroughly the whole problem of training doctors for an industrial society.

Dr. Darley's suggestion aroused wide interest. In consequence, the National Fund for Medical Education assembled a group of leading industrial physicians and medical educators who formed a planning committee. Consultations were held with the Health Committees of the Iron and Steel Institute, the American Petroleum Institute and with the Manufacturing Chemists Association, as well as with individual members of the Automobile Manufacturing Association, all of whom heartily approved Dr. Darley's suggestion.

The United States Steel Foundation generously offered to finance the conference and the publication of this report. The Mellon Institute graciously made its facilities available for the conference and materially assisted in arranging the program. The conference was held in Pittsburgh on December 6, 7 and 8, 1955.

From the standpoint of industry the conference was eminently successful. It gave corporation spokesmen an opportunity to discuss with medical educators some of the major health problems of industrial plants and surrounding communities. It also gave them an opportunity to learn something more of the potential of industrial medicine and something of the opportunities open to industry for the promotion of health services.

There was general agreement on one important point of special concern to industry: that industrial medicine is not limited to the place of work. Its influence spreads far beyond plant gates, out into the homes and neighborhoods where workers live. Health protection for the worker and his family requires not only good in-plant health programs, but good public health, preventive medicine and individual health education as well. And these can best be promoted through cooperation on the part of management, organized labor, the medical profession and public health authorities.

If these groups are to work together effectively, however, they must understand each other's problems. Doctors and health officers will need to know the conditions under which people work and live in an industrial environment. Corporation executives will want to know how the services offered by the modern plant fit into the over-all health picture.

Management, for its part, is showing a willingness to accept increasing responsibility for the promotion of the health resources of the nation. It is joining with labor and other organizations in the sponsoring of health insurance and medical care programs. It is contributing more than $400 million annually to health, welfare and education—of which probably one-fourth goes to hospitals and voluntary health causes. It is footing at least one-third of the nation's $200 million medical research bill, and through the National Fund it is contributing increasingly to the support of medical education.

From the medical profession, on the other hand, it seems reasonable to expect two things: (1) the continued development of the technical skills necessary to translate new medical knowledge into health benefits and, (2) mounting leadership in national and community efforts to promote a healthy physical and social environment. The first is already being provided in abundance by our medical schools. There never was a time when doctors were so skilled, when they had so many scientific aids and could accomplish such miracles of healing and health building. The second, as was pointed out at Pittsburgh, will depend in part on the degree to which medical educators are able to instill in the medical student a firm realization of his responsibilities for leadership in our industrial society.

One of the prerequisites to cooperation, of course, is the ability to communicate. If industry and the medical profession are to work more closely together, constant exchanges of views are essential. Needless to say, the Fund will continue to do what it can to encourage such exchanges.

We in this country are justly proud of our progress in the medical sciences. We are proud of our achievements in bringing the benefits of medical knowledge to progressively larger segments of our population. The Fund is confident that, as industry and the medical profession get to know each other's problems more intimately, even greater headway can be made—especially in industrial areas—and we can continue to look forward to steadily advancing health and living standards for all Americans.

Conference on the Education of Physicians for Industry

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University of Oklahoma School of Medicine

CHAIRMAN of the conference on The Education of Physicians for Industry was Robert A. Kehoe, M.D., Director, Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati.

Introduction

Robert A. Kehoe, M.D.

THE FOLLOWING PROCEEDINGS of a conference of medical educators and industrial physicians, arranged by the National Fund for Medical Education, and held in Pittsburgh, Pa., on December 6, 7 and 8, 1955, should be of interest to many more persons than those who participated in the conference. The problems considered are of more than casual importance to all who are responsible in any manner for the health of the people who bear the burden of modern industrial production and distribution. The discussions impinge directly upon the interests and efforts of all educators in the field of human health, upon all industrial physicians, and to a lesser extent, upon all other physicians, since they were concerned mainly with the need and the means of adapting the practice of medicine to the demands of our complex industrial society, insofar as this might be achieved by appropriate methods of medical education.

The very nature of the discussions necessitated the limitation of the participants to a small group, and there is little doubt that certain voids in the information furnished by this record of the proceedings might have been filled by other participants whose wisdom and experience were not available. For this reason and for others that will be evident to all who have given serious thought to the medical problems of the times, it would be well if the product of the conference were to be regarded as only the beginning of an examination of the place and scope of occupational medicine in the general scheme of medical education, and as a stimulus to further thought and to other solutions than those envisioned.

The mechanism of the conference was that of bringing together a group of about 30 medical educators—responsible representatives of the Association of American Medical Colleges, the deans of certain medical schools, certain professors of medicine, surgery, preventive medicine and industrial medicine—and an approximately equivalent number of practicing physicians —medical directors and members of the medical staffs of more than a score of industrial organizations. The composite group of conferees was divided into four panels, and three periods of several hours each were allotted for the deliberations and discussions of the panel groups, these having been kept small, so as to provide opportunity for direct and free exchanges of ideas among the individual members. The panel sessions were preceded by a series of talks by persons selected to challenge the efforts of the panel-

ists, by setting forth some of the outstanding needs of industry and the most significant shortcomings of medical knowledge and practice in relation to such needs. They were followed by broad expressions of the viewpoints of leaders of industrial management and medical education in a terminal open meeting.

The frank objective of the conference was to enable the physicians in the two categories—educators and industrial physicians—to discuss their separate problems together, and on the basis of mutual understanding, to examine means whereby the training of physicians in the principles and techniques of occupational medicine can be provided effectively and with appropriate scope in the undergraduate (regular instruction toward the medical degree), graduate (training of specialists), and postgraduate (special periodic and short-term indoctrination of practitioners of medicine) phases of professional training.

The extent to which the conference attained its primary goal must be judged by each reader of these proceedings for himself. Food for serious thought will be found in the talks that preceded the panel discussions. It seems likely that in these, and in the reports of the panel discussions, glimpses will be caught of many difficulties that present themselves to a society which has rushed headlong into new ways and conditions of working, thinking and feeling—in short, into the hitherto unexplored and complex way of individual and collective life that characterizes the modern industrial community. Certainly, some of these difficulties, that are of direct concern to physicians and medical educators, will be evident, as will, also, the somewhat surprising degree of unanimity on the part of the conferees in the appraisal of these difficulties and in the approach to their solutions. The extent of this working agreement may be expected to multiply the educational efforts in occupational medicine which are now being made in only a few centers of professional training.

Something should be said of the climate of good will and the spirit of honest inquiry which characterized the entire conference. These qualities of the meeting offer greater promise for the future than any other results that might have appeared. Exchanges of information and of opinion were frank and often vigorous, and they were actually exchanges and interchanges. As these were summarized in the reports of the several panels, they were not submerged in the generalizations and platitudes of innocuous compromise. Rather they became acceptable but varied bases for action, albeit types of action subject to critical appraisal at all stages, and conditioned, for their growth and development, upon the availability of facilities and opportunities for practical experience. The scheduled end of the conference came as a release from an arduous task, but it brought to many of the participants a sense of satisfaction which was the more remarkable because it had not been expected. Much had been learned and the way had been paved, in both of the primary groups, for learning more and for working toward a goal, which if not on strictly common ground, could become such, if an equivalent attitude of give and take were to prevail beyond the stage of discussion into that of action.

The ultimate results of this conference will depend in part upon the spread of its ideas by means of the record and by word of mouth. A goodly number of industrial physicians will have acquired, and many, one hopes, will transmit to their lay industrial associates an increased respect for medical education and medical educators, and a better knowledge of the means by which evolutionary changes in a time-tested educational regime can be made. On the other side, a representative group of medical educators has learned that the current shortcomings of professional training, with particular reference to its failure to recognize and to act upon the needs of this industrial nation, are not figments of the imagination or products of the capricious experience of their medical colleagues in industry, but rather that they are threats to the physical and mental security of our people. These facts, on both sides of the situation, need to be spread throughout the entire industrial and medical community.

To a much larger extent, the beneficial results of the conference will depend upon the translation of idea into action, with both industrial and educational circles. The facilities for the education of physicians for industry are grossly inadequate, in terms of either professional personnel or material equipment, for any of the necessary functions of research, basic instruction and clinical training. It is not possible to create these facilities, with the best of purpose and planning, without the financial backing of industry and the assistance of its professional personnel. On the other hand, responsible leaders in the field of medical education may properly be expected to take the initial steps required to demonstrate their awareness of their social responsibilities and their competence to make effective use of the facilities, instruments and disciplines, in this field of education and practice.

The stage has been set for joint understanding of the problems and for joint attack upon them. The issue now is the personal acceptance of the duty of going beyond the generalities of understanding into the details, and then of instituting appropriate action. That this can be done is clear. That it will be done is a matter of hope, and of faith justified by the spirit of the conference.

CONFERENCE ON THE EDUCATION OF PHYSICIANS FOR INDUSTRY

OPENING SESSION

December 6, 1955

(Mellon Institute Auditorium)

PRESIDING

ROBERT A. KEHOE, M.D.
Conference Chairman

ADDRESS OF WELCOME

DR. EDWARD R. WEIDLEIN
President, The Mellon Institute for Industrial Research

SEMINAR: RESPONSIBILITIES OF SOCIETY FOR HEALTH IN OUR INDUSTRIAL WORLD

NORVIN C. KIEFER, M.D.
Chief Medical Director
Equitable Life Assurance
Society of the U. S......".Needs and Problems"

The Problems of Industrial Health as seen by:

The Industrialist	WILLIAM SEYMOUR *Senior Vice President* *Liberty Mutual Insurance Co.*
The Medical Administrator	LEO WADE, M.D. *Medical Director* *Esso Standard Oil Co.*
Industrial Workers	CLINTON S. GOLDEN *Former Executive Director,* *Trade Union Program,* *Graduate School of Business* *Administration—Harvard* *University*

Address of Welcome

Dr. Edward R. Weidlein
President, The Mellon Institute for Industrial Research

IT IS MY great pleasure to welcome all of you to Mellon Institute for this Conference on the Education of Physicians for Industry. We here at the Institute are happy to have a part in bringing together such a distinguished group of medical educators and industrial physicians to discuss the future of industrial medical education in this country. In the face of the constantly growing industrial activity, the problem of maintaining the health of the worker and his fellow citizens is a crucial one today.

Occupational medicine, as you all know, is now recognized as a special field of medicine, and certification of physicians for this professional specialty by the American Board of Preventive Medicine began this year. The growing attention to health maintenance in industry has been reflected in the improved health status of the nation.

Mellon Institute since its organization has been deeply interested in furthering medical education, as well as graduate studies in the other professional fields. Members of the Institute are encouraged to continue their studies, and special arrangements have been made with the University of Pittsburgh for those who wish to work toward graduate degrees. We are proud of the fact that, to date, 115 of our people have obtained doctors' degrees while working on fellowships here at Mellon Institute, and 110 others have earned their masters' degrees. I might add that 17 former Fellows of Mellon Institute are presidents of corporations today, big corporations; 29 are vice presidents, and 229 hold important executive positions in industry, trained here in Mellon Institute through their research work and better understanding of the problems that relate to human needs.

Mellon Institute cooperates with the University of Pittsburgh by providing lecturers for scientific courses from the Institute staff, particularly for the school of medicine and the graduate school of public health. Senior members of Industrial Hygiene Foundation's staff lecture in the department of occupational medicine.

Industrial Hygiene Foundation several years ago placed a scholarship student in the graduate school of public health at the University of Pittsburgh, and the recipient has been granted a doctor's degree from the school this year.

The Foundation has also been instrumental on several occasions in having

industry set up scholarships in graduate medicine for special students. A number of graduate students have also received training and indoctrination in environmental health techniques in our laboratories.

As you know, Mellon Institute's founders had a keen interest in activities of human welfare. In 1914, R. B. Mellon established the Mellon Fellowship in Cardiology, and Dr. Andrew P. D'Zmura was chosen to go to London to aid in the construction of the first electrocardiograph. The following year the cardiograph was brought to St. Francis Hospital, where Dr. D'Zmura is an associate in medicine. The fellowship was subsequently transferred to Magee Hospital, where it continued until 1940. Formalized residency training became the practice, and the fellowship was no longer needed for this purpose.

With such a background, Mellon Institute has a special interest in the subject of this conference, and we are happy to be your host. We are equally pleased that the city of Pittsburgh was chosen for this conference. Pittsburgh has been a highly industrialized city since the middle of the 19th century, and has been the steel, coal and glass center of the world for many years. Tremendous progress has been made here in developing and expanding key industries within the area. The second largest chemical industry in the country had its start through fundamental research right here in Mellon Institute.

Pittsburgh is also a growing medical center, with the University of Pittsburgh's School of Medicine as a nucleus. This school has the oldest continuous curriculum of undergraduate education in industrial medicine.

I am certain that the seminars and the panel discussions which will take place at this conference will have far-reaching effects in assuring that industrial medical education will not be neglected, and that even greater strides will be made in this country toward better health maintenance for both the industrial and general population.

Responsibilities of Society for Health in Our Industrial World

Norvin C. Kiefer, M. D., M. P. H.

Chief Medical Director, Equitable Life Assurance Society of the United States

DURING THE 20th century, most physicians have been so preoccupied with glittering scientific developments, and with acquiring knowledge of them for the benefit of their patients, that they failed to give adequate attention to the socio-economic changes that were occurring at the same time in the world in which they followed their professional pursuits. Philosophically, the practice of medicine continued pretty much as usual. Such changes as did occur were largely the result of medical advances and general technological improvements.

During the first part of the century, the increasing momentum of social and economic reforms, particularly among our industrial workers, was recognized and approved by many physicians. But few of them thought of these changes as things that would have a profound effect on their own professional careers.

The first shock to this sort of complacency came with the great financial depression of the thirties. Such terms as "compulsory national health insurance" and "socialized medicine" began to plague physicians in mounting crescendo. We reacted belatedly and violently—and found, to our dismay, a considerable lack of sympathy with our viewpoint on the part of a substantial portion of the American public, many of whom called us "reactionaries."

That depression brought out a nationwide demand for strengthening of something man has always striven for: security. In a maturing democracy, a population deprived of economic security was in the mood to institute reforms and new programs aimed at increased security—economic, social and other.

One of the greatest demands was for increased personal security against

the costs of illness, whether these costs be measured in loss of income through disability, in expenses incident to medical, hospital or related care, or in cessation of family income because of death of the wage-earner.

The depression ended and has been followed by a great era of prosperity. An enormously expanded "middle class" is earning all-time high incomes. But the demand for security has not diminished in the least. The cost of living also has gone to an all-time high, so that as much as ever most people feel the need for financial protection against income loss due to illness, or death, and they know that the cost of paying for care during illness has reached frightening dimensions.

It is estimated that about 105 million people in the United States are now insured, to varying extent, through voluntary insurance, against the costs of medical care, hospitalization and similar expenses. The total disbursements from all of these insurance plans—of insurance companies, Blue Cross—Blue Shield type of organizations, and independent groups—will total about $3 billion in 1955. A very substantial portion of the 1955 income of American physicians and other health workers, and of the payments to hospitals, has come directly or indirectly from these sources. I cannot tell you exactly what part of these insurance holdings and disbursements represent industrial group insurance plans but it is safe to say at least three-fourths of them do. In 1954, reports compiled by the National Industrial Conference Board from 500 large companies indicated that over 98 percent of them provided some form of hospital insurance to their employees.

Industrial America is coming to accept on an ever-widening scale the idea that the health of employees is a basic asset, that there is a direct relationship between health and efficiency. And, having recognized the value of employees' health, American industry—and by this I mean both management and labor—is engaging in active programs to conserve or restore health.

Undoubtedly there will be a considerable exchange of detailed information about these programs during this meeting. I want to spend a few minutes in reviewing some of the major developments with relationship to their trends and significance to general public health in our modern industrial society:

1. *Pre-employment medical examinations:* It is a new phase—pre-placement examinations—to which I wish to direct your attention. The trend today is toward the employment—within reasonable limits—of many handicapped people. The purpose of the pre-placement medical examination is to appraise the job applicant's health impairments, whether major or slight, in the light of the demands of available jobs. Thus the medical department helps the company to avoid placing the new worker in a job which he should never attempt, but may be able to classify him, according to his health status, as entirely capable of carrying on another job, effectively and without detriment to himself. Preventive medicine is thereby utilized, from the beginning of employment, to protect both employer and employee and, at the same time, to salvage many valuable workers.

2. *Provision of emergency medical care:* The convenience and availability

of these services in the industrial medical department encourages employees to use them liberally. Here is a highly effective form of health education which encourages early attention to even minor ailments. The private physician benefits because the employees with significant illness who are referred to him for continuation of medical care frequently are seen earlier, on advice of the industrial medical department.

Even more important, perhaps, are the good habits with respect to medical care which thus may be stimulated, not only in the employee but also in his family, and in a large number of employees and their families, and thus in the community.

3. *Assurance of healthful general working conditions:* Here is public health in action in a specific population. Potentially the results can serve as a model for the community, and they can be carefully observed, and then reported for the benefit of others. Here is a real opportunity for industrial physicians to put the results of their activities to work for the benefit of the entire community—and to communicate their results to medical educators for their use in teaching.

4. *Control of specific industrial hazards:* Here the record of industrial medicine is superb. With the help of the toxicologist, chemist, engineer and others, industrial physicians have brought one after another of formerly serious occupational health hazards under absolute control. A personal experience well illustrates the prestige that such programs have gained in industry. Recently, in the Equitable Life Assurance Society we reconsidered a rather long-standing occupational rating which we had placed on insurance applicants who were employees of a large industry which deals with a toxic substance. We removed the rating. Our decision was based solely on an excellent, comprehensive report, which showed complete control of the hazard throughout the industry concerned. The report was made by one man. We accepted it because of our knowledge of his competence and our confidence in his integrity. To me, this was a tribute to the value of competent practice of industrial medicine and to the ability of the particular physician in this case—and it happened to be your chairman today.

5. *Provision of periodic health examinations and health counseling:* This is perhaps the most significant activity of all. Potentially these activities can develop into the greatest individual preventive medicine service in American medical history. In the future, literally millions of American industrial employees will be provided such services. Eventually, the beneficial effects on their health should be amply demonstrated—otherwise we are deluding ourselves about the value of these fundamental preventive medicine activities. Because of centralized administration of this medical program in each industrial corporation, the information which could, in time, be recorded and analyzed, in a carefully studied population group, would be of incalculable value to preventive medicine and public health in general.

The impact of expanded industrial health programs must be measured, not just in terms of the employees' health, but by their effects on entire communities. At a meeting sponsored by the National Fund for Medical Education earlier this year, Robert E. Wilson, chairman of the board of

the Standard Oil Company of Indiana, made the following significant statement:

"Corporations are today social institutions exerting a wide influence beyond the plant gates in the areas where they operate—and the community attitude in turn affects the corporation. On this premise, management surely has a responsibility toward the entire community. Our corporate well-being is directly related to the quality of the schools in our plant community, to the efficiency of police and fire protection, to the good operation of the health department, and to the medical and hospital care available."*

Unfortunately, many physicians, preoccupied as they are with care of their patients and keeping up with constant scientific medical advances, have not recognized or understood the extent and significance of the social changes in which they are engulfed, in both their professional and personal lives. Far too often, their knowledge of medical programs for industrial workers, for example, is concentrated largely on the annoying by-products, such as the increase in reports and other paper work.

These things *are* annoying, of course, and require increased clerical work in the physician's office—but they also are inevitable in large, complex, administrative programs, medical or otherwise. Industry, which long ago had to adjust itself to increasingly complex reporting systems, frequently finds it difficult to understand complaints about paper work, from the physician who is, after all, a primary beneficiary of the dollars that are spent through industrial health programs.

Often the physician becomes quite vocal in his resentment against having to answer questions to which employers or unions, in order to administer medical care "fringe-benefits" programs, must have clear answers—but he fails to realize that his is the rather unique privilege of having his statement usually accepted at face value, rarely disputed.

Sometimes, when he knows that an insurance indemnity payment is involved, he makes the maximum charge in his usual range of charges for the particular service performed, and apparently he is influenced in making this decision more by the ability of the insurance company to pay than by the patient's financial status. In doing so, he seems to be unaware of the fact that accumulation of a number of such maximum charges often results in a compensatory adjustment of the insurance premiums to be paid by the company for which his patient works. The increased cost of maintaining the insurance thus is borne by the employer or by the employees, or both.

Furthermore, these payers of insured medical care costs soon identify the original source of their increased expenses, and become just as resentful as the individual patient who thinks his physician has overcharged him.

The physician frequently complains about the increased number of medical inquiries concerning his patients when they apply for life insurance. He doesn't stop to think that insurance companies probably are distressed, too, over the need for the inquiries because they cause delays and

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*Wilson, Robert E: "Industry's Stake in Medical Education," *J.A.M.A.* 157:18 April 30, 1955.

increased operating costs. He forgets that the increase in requests for such statements arises in part from the increase in use, by the general public, of medical care facilities and services—and that he, along with his colleagues in health services, is chiefly responsible for having successfully stimulated American citizens to take better care of their health and to seek medical advice earlier.

In criticizing the intrusion of voluntary pre-payment groups, or insurance companies, or industry, into his professional time, he is making the tragic error of overlooking the simple fact that the alternative is the thing he fears and hates most: intrusion by governmental agencies.

Of course, these remarks do not apply to all physicians—but they do apply in some degree to a sufficiently large number to alert those of us who are aware of these situations to the fact that something *must* be done about it. Somehow, the physician must become far more aware of his full relationships to a distinctly altered social philosophy and economic milieu in our present industrial world.

First of all, he must learn that there is no turning back from the social changes in the industrial world of 1955 to the world in which his grandfather and father—perhaps he, himself—once practiced medicine. Today's physician must learn to adapt himself to the social and industrial world of today and, even more important—because today already is in twilight—of tomorrow. He must learn that industrial and other voluntary health programs, although they may force him into some alteration of the conduct of his practice, nevertheless are based on an ideology of private enterprise and therefore are fundamentally sympathetic to his own desire to protect the private practice of medicine.

These programs need the physician's understanding, active participation and full cooperation. If he fails to give such support, the result will be a weakening of such programs to a point where they no longer can satisfy public demand. Can we assume other than that from the resultant prostrated private health system will emerge a mighty governmental health program?

If our private system fails, what other answer could there be from a maturing democracy?

Mere understanding and recognition of industrial health programs by the medical profession will not be enough. One of the great tragedies of our profession, in the last few decades, has been the failure to provide adequate numbers of physicians for administrative medicine. Official public health agencies, voluntary health organizations, industrial and union medical programs, larger hospitals and clinics, philanthropic foundations supporting health work, research programs and many others have become so large and complex that they require expert leadership and administration.

Few will deny the desirability of placing such responsibility in the hands of a trained physician-administrator. But if such physicians are not available, important medical programs develop under lay administration and, ultimately, lay leadership and control.

Today, the number of important organized health programs is continuously increasing—and, by comparison, the number of available medical

administrators is shrinking. Therein is the making of another first class crisis to the medical profession. Are those of you who are medical educators doing everything you can to meet this crisis?

In industry, large companies are the very ones to whom the National Fund for Medical Education is most likely to turn for financial contributions. Also, they are the ones who are most likely to have comprehensive health programs. What is medical education doing for them? None of them, I am sure, demands full reciprocity from you. But is it fair to ask their support of medical education—and our present system of medical practice—only to have medical schools, in effect, turn their backs on the personnel needs and ignore the health service objectives of these companies?

Well, there are some of the great problems we all face—and that we *must* solve. What is the role of the medical educator? In my opinion, he can do far more than anyone else to solve these problems. All of the scientific medical competence you can instill in your students won't provide the slightest solution, unless you also can thoroughly and convincingly educate them, throughout their academic years, in what other things society needs and expects—and will demand—of them in our industrial world.

No other period in the physician's career is so critically favorable to such teaching as the one during which he is in your hands to mold and guide. And while you are placing in his hands the precious tools of medical science, you also must teach him, more thoroughly than ever before, how he, in using them, can best serve society in our industrial world.

Public health, industrial medicine, medical administration and related essential subjects should be an integral part of all your teaching, from the first freshman day until graduation. Do you really think that a medical student understands coronary artery disease, for example, if he has been taught only its cause, nature and clinical aspects—no matter how thoroughly —but has been taught nothing of its management as a serious problem to public health, or industrial medicine, or hospital administration, or to voluntary organizations and private foundations?

Have we really remedied the student's lack of understanding of these other aspects of management of this—or any other—disease simply by exposing him to a series of disconnected presentations of these other factors?

Such a fractionated approach not only may be too time-consuming in your already-packed curriculum but, much worse, it does not encourage the medical student to develop a broad comprehension of his role—not just as the future physician caring for a specific disease in an individual, but as a responsible and respected leader for solving nation-wide health problems which similarly affect thousands, or millions, of other individuals in all walks of life.

If we make these other important subjects an integral part of clinical teaching, *all* medical students will have a broader socio-medical foundation, and will gain greater knowledge and recognition of the vitally important role of specialties other than those of purely clinical medicine. They will develop a much greater respect for the knowledge and competence that must be possessed by their professional colleagues in all other forms of

health services. And, by thus expanding the field of interest of students before they have committed themselves to definite clinical pursuits, more of them will be guided into work in which they will provide the leadership, guidance and administration to industrial and other broad health programs in the future.

Finally, I do not think that these additions to your curriculum would be as big a burden as they might appear to be. Actually, this is not so much a matter of adding a number of new courses, as it is the need to install, in teaching concepts—particularly among your clinical faculty—an expanded philosophy of medical service.

We must broaden our concepts—and widen our horizons—of services to the health of the nation. We must rededicate ourselves to giving to the public what it wants and expects. We must recapture our leadership of health programs—but this must be done by educating our physicians to full understanding of the new problems and their related administrative difficulties, and to widespread, intensively active participation in such programs.

Only in these ways can we assume our full responsibility to society for health in our industrial world.

The Problems of Industrial Health As Seen by the Industrialist

William H. Seymour
Vice President, Liberty Mutual Insurance Company

FIRST, I WOULD like to congratulate the National Fund for Medical Education for bringing together at this meeting a carefully chosen group of medical educators and industrial physicians. I think such a meeting has been long overdue. I hope it will be followed by constructive action in the field of medical teaching.

While I am not a doctor, I have been involved with my people for the last 15 years in the application of medical skills and knowledge to the needs of industry, in many thousands of plants. As a matter of fact with a staff of 26 nurses and seven M.D.'s we have reached over 25,000 plants, with varying degrees of success. While the physician usually views the individual problem, our experience has been with industry's problems in the mass. Thus I should be able to act as a catalyst, understanding some of the problems of industry, labor and medicine and bringing the three together. It is from this experience that I wish to speak to you today.

Let me state emphatically here that industrial medicine did not grow in this country because doctors developed it. In fact, particularly in the early days, organized medicine fought against its development. It grew because industry needed it, wanted it and went about getting it. This was a relatively simple task when the primary need was for curative medicine from the traumatic surgeon. But today's need is for an entirely different medical orientation. Not alone the treating of the sick and the repair of injuries, but the maintenance of a more or less healthy group of employees in full working effectiveness. Medical schools produced well-trained traumatic surgeons to meet the scope of yesterday's industrial medicine. They are not producing the physician, oriented to health maintenance, to meet the needs of today's and tomorrow's industrial medicine.

To explain why I make that flat statement, suppose I divide industrial medicine into three aspects:—traumatic surgery, preventive medicine and constructive medicine. The first one, traumatic surgery, is well known to

most everyone. In fact even today it is considered by many to be the sum total of industrial medicine. With the passage of the workmen's compensation acts, making industry responsible for payments for lost time and medical costs resulting from work-connected injuries, industry brought in the traumatic surgeon to handle the injuries that might occur.

As occupational diseases become more apparent and less known exposures appeared in industry, it became necessary to begin the preventive aspect of the program, through the teamwork of engineers and doctors under the name of industrial hygiene.

The use of safety engineers, doctors, nurses and industrial hygienists for the prevention and control of workmen's compensation experience has produced tremendous results. In the past 30 years American industry has reduced accident frequency by more than 60 per cent. Some companies have even reduced their accident frequency and severity by much more than that amount. It has thus been possible to increase workmen's compensation benefits to the employee considerably without their cost being prohibitive to the employer.

The challenge in that field is not at all finished. New methods, new materials, new chemicals still are coming into industry. I think a particularly outstanding example of this is in the field of electronics, where little is known regarding some of the exposures, effects, tolerance levels and individual susceptibilities.

Having accomplished such gratifying effects in accident prevention, industry now finds the cost of nonoccupational illness and disability increasing, especially with the recent rapid growth of group insurance plans to cover nonoccupational conditions. Opportunities for further development of preventive medicine appear. There are medical conditions, not caused by a man's work but having a significant bearing on his effectiveness at work, that can be approached through preventive medicine. Some of these conditions can be prevented from developing. More commonly the condition itself cannot be prevented but much can be done to prevent or to stall off disability due to the condition. From the point of view of the individual and of industry it is the disability that causes loss of wages and loss of production. For example, medicine today does not know how to prevent diabetes, but a great deal is known about how to prevent disability from diabetes, to help the individual to enjoy a long, productive, self-sufficient, satisfying life.

Preventive medicine in industry has thus become a case-finding program. Its aim is to find medical conditions early when they are amenable to treatment and control, to see that they have proper medical supervision to prevent them from becoming disabling.

Now there is added a third aspect, "constructive medicine," a concept promulgated by Dr. Edward Stieglitz. This does not wait for conditions to develop before taking active medical steps. Constructive medicine means working with a healthy individual to assist him in planning a way of life that will keep him healthy or even improve his level of health.

In the beginning I said it was industry that started industrial medicine.

Industry needed it, wanted it and set about getting it. Now industry's needs lie in the field of preventive and constructive medicine. There are many reasons why this is so. One important reason is the growth of prepaid health insurance plans to cover nonoccupational disabilities. The breadth of coverage and the scale of benefits in these plans have increased. And either voluntarily or through collective bargaining, industry in greater numbers has been paying the whole cost of these benefits. So it is common today for group benefits plans to cost industry five to ten times as much as their workmen's compensation costs.

These benefits are paid for nonoccupational disabilities. Here then is one of industry's significant reasons for needing and seeking an industrial medical program that goes beyond curative traumatic surgery and involves itself in preventive and constructive medicine. As you no doubt know, these disability benefits plans are experience-rated; that is, the cost of the plan is determined by the amount and extent of disability that must be paid for. Thus, if preventive and constructive medicine can keep people from becoming sick and disabled, there will be less drain on the fund, the net costs to industry will be less, and the benefits to the worker may thereby be increased—and I have seen it happen.

Another important reason for industry's growing need for preventive and constructive medicine lies in the increasing significance of the human element in the production scene. To describe this I quote John L. McCaffrey, from Management Briefs in the *Chemical Digest* of the Spring of this year. He states, "The biggest trouble with industry is that it is full of human beings . . . .

You will learn to your sorrow that, while a drill press never sulks, or a drop hammer never gets jealous of other drop hammers, the same cannot be said for people. You will learn that a turret lathe may run one part for 10 years without affecting its willingness to be switched at any time to another part.

"You will learn that you have with people the same general problems of preventive maintenance, premature obsolescence or complete operational failure that you have with machines. Only they are very much harder to solve."

I would like to add that they cannot be solved adequately without a modern industrial medical program geared to the preventive and constructive approach. This must be a program that deals with the whole man, the individual, in his total environment, his environment in the industry and outside the industry.

Industry needs physicians with the right training and orientation in order to maintain and increase the individual effectiveness of its people. Here I use the term "individual effectiveness" rather than "health." We cannot expect to make perfect physical specimens out of the entire working population. By the term "individual effectiveness" I mean the ability of a worker to perform his chosen work well and to live well in the environment in and outside of the plant; by that term I mean the summation of all the factors that *affect a person's productive capacities.* This can be significantly affected

by an industrial medical program, but only if it is staffed by medical personnel trained and oriented in preventive and constructive medicine.

As an engineer it is contrary to my training to accept unsatisfactory conditions without trying to change them. When I find some of my own people going along at half speed, especially those *in the older age brackets,* I want to try to do something about it. Our experience in policyholders' plants gave us some knowledge of what could be done through preventive and constructive medicine. This knowledge we have been applying to our own problems with some gratifying results.

This problem of aging has become increasingly vital to industry. It is a problem that curative medicine is not at all equipped to handle. I believe it can only be handled adequately in a modern industrial medical program. Let me try to explain why *I* believe that.

Up until the time a man reaches the age of 40 his job is primarily merely a means of livelihood. Ordinarily he has wide physical capacities to perform a variety of jobs. His medical needs and those of his wife and children are usually due to acute conditions. These produce pain, fever and other effects that drive him to his family physician, and his family physician with his curative approach handles the acute problem well. However, little, if anything, is accomplished by the doctor in alerting the man and his family to the importance of good health practices and how health maintenance will delay and modify the ravages of the aging processes.

After the age of 40 acute conditions in himself and his now-grown-up family are much less frequent. Now the man finds his job a more vital center of his life. Now or soon he begins to develop some degenerative changes. These are not acute. They do not disable immediately. They begin insidiously. They do not drive him to his physician. Even when they begin to disable, he usually considers them the unavoidable consequence of getting older. Instead of having wide physical capacities to do a variety of jobs, now he is beginning to develop changes which may limit his work assignment.

In the industrial medical department a program of regular health examinations brings him to the doctor so that aging changes can be identified early and steps taken to meet them. Also the industrial physician is in the best spot to review both the man *and* his job to assure continuing proper job placement.

I am convinced that the best way to handle the aging problem in industry is for industrial medical departments and physicians in the community to team up in the practice of preventive and constructive medicine. Actually we are talking about adult health maintenance and could well apply a lesson learned years ago in the field of child health maintenance. Pediatricians made little progress in preventive practice until the school health programs afforded the group setting that seems to be necessary to successfully carry out health education. Industry creates an identical setting for adult groups with which the industrial physician can work in applying the techniques of health education, health counseling and case finding. The properly oriented community physicians, much like the pediatricians,

can handle the definitive preventive and constructive health care of their patients just as they now treat those in need of curative medicine that are referred by industrial physicians.

These are, very briefly, some of the things that industry needs from the medical profession. I have said that medical schools are not turning out doctors oriented to meet those needs. Let us explore that idea a little further.

For many years the doctor has been trained to diagnose and treat. During the past 50 years his ability to diagnose and his skill in treatment have improved tremendously. That means, however, that the patient must have some sickness or disease to be diagnosed and to be treated. The average physician is baffled by a patient who has nothing "wrong" with him. The patient must furnish the doctor a symptom or a physical finding or some abnormal laboratory test as a point of departure in the technique of diagnosis and treatment.

But the need of industry is to keep well people well. Here is the serious need for a physician oriented to health as well as oriented to sickness and disease. Further, keeping well people well requires an in-plant physician. He must know the industrial scene, the production problems, the labor relations picture, the union contract, the placement possibilities and a host of such things. These will have a bearing on how he handles his cases.

Even the physician who will never actually practice industrial medicine will inevitably treat people who work somewhere in some plant. He needs to know something about industry and industrial medicine if he is to do an adequate job of taking care of his patient, particularly if he is to play his proper role in the development of health maintenance of our industrial population.

You are here for this three-day meeting to consider the problem of teaching industrial medicine at three levels, undergraduate, graduate and postgraduate. I am impressed with the progress that is being made in graduate education in industrial medicine. The new board certification in industrial medicine will give further impetus to that.

There has been some, though less, progress in postgraduate teaching. More effort is needed to furnish short orientation courses in industrial medicine to the physician who is out of school and in practice.

I think the *real serious* need is for teaching at the undergraduate level. I am aware that the medical school deans and others responsible for the development of medical school curricula face a serious problem. They feel that each new specialty, each splinter group in medicine, wants to hack out for itself a piece of the already overcrowded medical curriculum. I would like to emphasize to you that this is not just another specialty, not just another splinter group. This is the backbone of the medicine of tomorrow.

To me, there is little reward in turning out more curative personnel to man more curative facilities to patch up things that never should have developed in the first place. That will not still the demand for socialized medicine, that will not meet the sore problem of the costs of medical care, that will not meet industry's needs.

American industry is the reason for this country's pre-eminence in world

affairs. Our working force is our most valuable resource. It needs to be husbanded carefully. The best place to develop health maintenance for our working force is at their place of work, through a modern industrial program. This requires physicians trained in preventive and constructive medicine. Whether the physician of the future is to practice in or outside of industry he cannot play his appropriate role in health maintenance of our population as long as he receives solely, or even primarily, a curative approach to his training. I do not view this as one small specialty trying to gain entrance to the medical school curriculum. I view it as the greatest challenge offered to the teachers of medicine since the Flexner report started medical schools on their upward path. It is a challenge which our medical schools cannot ignore. They must find ways of meeting it if they are to continue to produce the kind of physicians that this country needs.

The Problems of Industrial Health As Seen by the Medical Administrator

Leo Wade, M.D., F.A.C.P.
Medical Director, Esso Standard Oil Company

MEDICINE MEANS many things to many people. Those without direct contact with the medical profession, relying upon television, radio or the current best sellers, must inevitably think of medicine as a dramatic and glamorous activity centered about an operating room replete with complicated gadgets. Indeed, someone suggested recently that the TV trend is such that it is only a matter of time until some enterprising young surgeon finds himself sponsored every Tuesday evening by a manufacturer of cutlery. As evidenced in this cartoon, the prompter's card, long a tool of the acting profession, may make a valuable contribution to the practice of medicine.

Courtesy of the Medical News, Vol. I, No. 5.

Seriously, however, even within the medical profession one finds many different concepts of medicine. Thousands of highly trained and competent specialists, seeing medicine from their narrow vantage point, have little or no concept of, nor concern for, the social, cultural, economic and even the broad scientific, implications of medicine. I do not mean to imply by this, or what is to follow, that we physicians in industry have a monopoly on a more comprehensive concept of medicine.

We do encounter, however, numerous human problems, less dramatic, to be sure, than those of the TV show, whose ramifications and proper solutions lie within the broad field of medicine. Curiously, many lay managers are more keenly aware of this fact, or at least are more eager to tackle some of the problems, than many of my confreres engaged in the practice of medicine. Certainly, efforts to find competent physicians with the broad vision required for this important work are extremely disappointing. It is for this reason that I am personally interested in the deliberations of this very important conference.

In order to delineate clearly some of the problems of industrial health, let us examine briefly the domain of medicine as a whole. Medicine is concerned with health and sickness. "Trite," you may say, but consider for a moment the relative volume of effort placed by physicians on these two components. Sickness and disease have until very recently usurped almost all the time and effort of medical faculties. Sickness and disease have provided the only basis upon which the majority of physicians have been able to make respectable livings. Indeed, the sincerity and professional ability of those who concentrate on "health" has often been questioned by lay and professional men alike. The financial reward for such work has never compared favorably with that of treating the desperately ill. The situation is even more "one-sided" than apparent by this analysis. Those concerned with "sickness" have given their attention by and large only to such "sickness" as can be demonstrated anatomically in the pathology laboratory. We in industry are acutely aware that the majority of "sickness" is not of that variety. And yet, it is just as costly and just as disabling as cancer and tuberculosis.

Health and sickness are alike in that both are relative states of well-being; health is never absolute and neither is sickness. Health has to do with the optimal adjustment of the *total person* (physical, mental, social and spiritual) to the *total environment* (not merely to microbes, cancer cells and automobiles, but also to plants, animals, people and things). The key to good health is not necessarily in terms of intact anatomy and physiology, but in the *adjustment* of the person to his environment. One finds repeatedly that a properly motivated person with even major defects in his anatomy or physiology can be productive and happy in a properly chosen environment. Conversely, persons with superb anatomical and physiological reserves may be useless because of mal-adaptation to their environment. In fact such mal-adaptations lead to a great part of the disability encountered in industry. Functional problems give way to actual organic disease as the stress is prolonged over the years.

It is in this area of fitting people to their working environment and fitting

the working environment to people that the physician can make a tremendous contribution. Industry, both large and small, urgently needs good clinicians with administrative ability and insight, and at least a speaking acquaintance with, or an interest in, psychiatry, psychology, social pathology, human relations, industrial hygiene, human engineering, sanitary engineering and safety engineering. The lack of qualified candidates is at least partly responsible for the failure to provide preventive and constructive medical programs to a much larger segment of the employed population. Certainly, there is need to implement such medical services in many smaller plants devoid of any industrial medical services or those with outmoded, surgically oriented programs directed to the economical treatment of compensable injury.

I do not mean to suggest any new demands on an already-overburdened medical school curriculum. Many of the defects noted among recent graduates of medicine are directly attributable to the presently overcrowded curriculum. Specialty upon specialty continues the minute dissection of the patient, with neither teacher nor hours available to reassemble him. The detailed information and techniques required for the practice of any specialty can be acquired and probably must be acquired through postgraduate training. In the case of occupational medicine, this training may be either formal (i.e. provided under university auspices) or informal (i.e. provided on the job).

We have difficulty in finding suitable candidates for "on-the-job" training, not because the candidates lack knowledge of "scientific" medicine but because they lack a comprehensive concept of health and sickness related to the "work-a-day" world in which the patient must live and earn his keep. The problem was summarized beautifully some 12 years ago by John Ryle, then professor of social medicine at Oxford. I quote: "We are most of us conscious of the fact that medicine during the past quarter of a century has become . . . not merely more specialized, but also more technical, and that in the process . . . the old aetiological interest and humanism of our fathers have tended to take a second place. In the teaching hospitals this can scarcely be disputed. Investigation to the limit, mainly by objective methods and often with too little said to or done for the patient during or after the tedious process, has been the prevailing trend, especially in the case of the more chronic or seemingly more obscure varieties of disorder and disease. More and more accurate assessments of local pathology, with the help of more and more colleagues and instruments, and less and less intimate understanding of the patient as a whole man or woman with a home and anxieties and economic problems and a past and a future and a job to be held or lost, have become the order of the day. As we direct our students, so in large measure must the outlook and method of each new generation of doctors be determined. Over-reliance on specific objective tests; too strong a belief in the potency of certain treatments aimed at altering established disease-states or too deep a despair at the apparent unalterability of others; too little knowledge of morbidity and mortality figures, of the relative incidence of diseases in the community, of the vast prevalence of "illness" or "debility" without "physical signs" and of their several significances; too vague an appreciation

of the fact that these illnesses and, indeed, many of the organic diseases have discoverable origins in social, domestic or industrial maladjustment, in fatigue, economic insecurity or dietary insufficiency—have not these already set their stamp upon the work and outlook of the younger generation of practitioners? And are the majority of those who teach them, most of whom have but little close acquaintance with the conditions in which their poorer hospital patients live and work, much wiser? There are notable exceptions, it is true, but their numbers dwindle. The sciences and techniques have come to dominate medicine to the exclusion of the most important science of all—the science of man—and the most important technique of all—the technique of understanding. Science without humanism may work with atoms but it will not work with man."[1]

Somehow the patient needs to be returned to the center of the stage and the etiology of "disease" considered in much broader terms than has been customary in our teaching methods.

The doctor needs certain attitudes of mind possibly best summarized as a positive philosophy of life. Such attitudes cannot be taught in the medical school but must be nurtured in the colleges and sought for by the admissions committees of the medical schools. Emphasis upon the sciences at the expense of literature, philosophy, sociology, anthropology, etc., in the pre-medical training has made a negative rather than a positive contribution to the effectiveness of the doctors graduated in the recent past.

Returning directly to the charge given me by your program committee, there are certain convictions which I present for your consideration. First, the treatment of disease (except possibly in the occasional uncomplicated "compensable" case) is not the province of industrial medicine. The treatment of traumatic or toxic disease attributable to industrial causes presents no peculiar problem. Such treatment belongs in the hands of internists, surgeons, orthopedists and other private practitioners of medicine. It is wasteful of medical manpower to try to assemble all the kinds of specialists needed to treat optimally so-called industrial disease. None of these specialists is equipped by training or experience to do a constructive job in the areas of prevention, environmental hygiene, administration, etc., peculiar to industrial medicine. The medical services provided in industry should supplement and not replace or compete with the existing medical facilities or those which might reasonably be expected to be attracted to an industrial community.

Second, and related to the above, is the need to keep the basic industrial medical services out of the realm of fringe benefits. The services provided should not be a part of any "give-away" scheme. There should be a reasonable basis for assuming that the medical services rendered contribute to the economic welfare of the company by maintaining or increasing the productivity of employees. To proceed on any other basis not only violates economic principles but also violates a fundamental health principle; namely, that return to health must be actively sought for and earned by the patient.

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1. "Social Medicine: Its Meaning and Its Scope," *Brit. Med. Jour.*, Vol. II, pp. 633-636 November 20, 1943.

This leads to a third basic consideration. Health is an intensely personal thing. No matter how important it may seem to management to keep the human resources in "good repair," it is essential to remember that employees can never be considered in the same manner as the physical tools of production. Medical services must be on a voluntary basis with good, ethical, doctor-patient relationships. Under such circumstances, employee cooperation is usually obtained. Without voluntary employee cooperation, no constructive goals can be achieved.

Fourth, the medical department must not be permitted to become a tool of management to attain unpopular or distasteful goals. The department must serve as staff advisors with primary concern for the long-term health and welfare of the employee. Medical facts or diagnoses are not the property of management, but the doctor's interpretation of these facts should be used by management in the interest of the company, its employees, its consumers and the community in which it operates.

In closing, I think I can best crystallize some of the foregoing thoughts by a statement of the objectives of the medical program in industry. The primary objectives, stated broadly, are to maintain, conserve and even improve employee health so that each employee may continue as a productive, self-respecting, happy worker and citizen for the longest possible time. To achieve this goal, the techniques of environmental and preventive medicine are of far greater importance than the techniques of therapeutic medicine. Certain secondary objectives are desirable and probably are inevitably achieved if the primary objective is properly sought. Some of these are: the development and maintenance of optimal employee or industrial relations; the achievement of optimal productivity; effective utilization of partially disabled workers; decreased risk of occupational disease; effective administration of employee benefit plans referable to health and sickness; the establishment of good working relations with the employee's personal physician as well as with various community agencies concerned with employee health and welfare.

As previously stated, these secondary objectives can only be achieved if the medical department is accepted by management as staff consultants in these areas. The doctor neither assures nor denies initial or continued employment. He advises management in nonmedical terms concerning the prospective worker's abilities and disabilities. It is the prerogative of management to select the workers capable of performing the job available. Similarly the medical staff should advise management concerning factors in the industrial environment which may affect unfavorably the workers' health. But management alone can effectively and efficiently provide for the correction of any such defects. Teamwork is an essential constituent of any effective medical program in industry.

In brief, the outstanding problems of industrial health are four:

1. Properly trained and qualified physicians for initiating and maintaining preventive and constructive medical programs in industry are few.

2. Confusion exists among medical educators and physicians in industry

regarding both the objectives and the methods for providing the needed personnel.

3. Undue emphasis upon the treatment of acute or life-threatening disease by most physicians has led many workers to expect that any good medical program in industry should provide free treatment of disease. These workers have little interest in and appreciation for other types of medical services.

4. Management, too, is often unclear as to what it expects of the medical department and, by and large, has not yet learned to use the physician optimally.

The Problems of Health as Seen By Industrial Workers

Clinton S. Golden
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WORKERS IN THE United States have always been concerned with problems of health. Their attempts to cope with their health problems through organized effort can be traced back to the latter part of the 18th century. Their efforts then and now, are reflected in the number of initially modest mutual aid associations and societies organized by those having common occupational or craft interests and skills.

These mutual assistance associations provided loans, sick benefits and burial funds for their members. Cash disability benefits to replace earnings lost during periods of illness were among the first benefits provided. Medical service programs followed thereafter.

In many respects these early mutual aid programs were an outgrowth of the so-called "friendly societies" which appeared in England during the initial stages of the industrial revolution. Several of our modern national and international labor organizations had their origin in societies formed by workers to render assistance to their fellow workers in time of need. In passing, it is interesting to note that the Brotherhood of Locomotive Firemen and Enginemen, one of the oldest and most influential of the railroad brotherhoods, was organized in 1873 as a benevolent society and did not assume the role of a labor organization until 1885.

To inject a personal note, let me say that I, as a locomotive fireman, became a member of that organization 51 years ago—in 1904—largely because at that time, railroad train service operation was so hazardous an occupation that insurance companies either would not insure engineers, firemen, trainmen and conductors at all, or at rates they could not afford to pay. The death benefit, disability and medical service programs of the railroad brotherhoods are today still an attractive feature of membership.

As our society has evolved industrially, so have the labor organizations. As they have grown into well established institutions they have assumed broader responsibilities to society. While their primary and basic purpose is

that of collective bargaining with respect to wages, hours of work, conditions of employment and the adjustment of grievances that arise, they are increasingly active in the fields of social and humanitarian legislation, health, vocational and other forms of education and community welfare.

As you may know, the International Ladies' Garment Workers Union established a health center in New York, as long ago as 1913. In the intervening years, other labor organizations have established additional and very modern facilities and in various ways have made possible medical care programs for their members.

As the labor organizations have grown and gained recognition from employers as legitimate agencies of representation, the attitudes of union members toward company-initiated safety and industrial health programs have changed from suspicion and distrust to growing cooperation with management in making them increasingly effective. There is a growing body of evidence that workers—organized and unorganized—are able and desire to participate *as a group* in activities that are related to their standards and conditions of life.

We are now living in an age of organization which necessitates profound adjustments in attitudes and in concepts of relationships between, and among, the individuals and groups having diverse occupational backgrounds and interests but who are solely dependent upon employment in business and industry for a livelihood. When the potentialities of group, as distinguished from individual, participation are recognized, the possibilities of organized group cooperation in promoting industrial health programs become apparent. It is group interest and activity that has contributed so significantly to the growth of the various, more or less adequate medical care programs, that are a feature of the social welfare developments of the past decade.

It is obvious, in view of the capacity of our people and especially industrial workers, to join their efforts for the attainment of common goals, that the most effective way to enlist their support for industrial and community health programs is through organized, cooperative action, that constantly enlarges the opportunities for individual recognition and participation. In short, in our kind of society, it is through nongovernmental, voluntary, self governing associations and organizations, that the citizens *most effectively* give expression to their aspirations and expectations and make the most significant contributions to the welfare of society.

I have made mention of the union organizations and their widening range of interests in the field of human welfare, not for purposes of argumentation, but rather to indicate that there already exists tremendously influential organized resources created by industrial workers that can, with understanding and skillful leadership, be more effectively mobilized to promote health in industry and in society generally.

Let me now direct your attention to some of the specific areas in which problems of industrial health are of major concern to industrial workers. Perhaps first comes the small industrial enterprises. About 90 per cent of all establishments reporting taxable wages under the Old Age and Survivors

Insurance program employ fewer than 500 persons. About 70 per cent of all employees in the United States are employed in these small enterprises

I am advised that less than 5 per cent of such employees have any type of in-plant or on-the-job health services. That there is a real need is indicated by figures cited in the *National Safety News* for October 1951 which show that accidents occur in small plants about 2½ times as frequently as in medium or large size enterprises.

In these enterprises it appears that the problem of industrial safety and health can be most effectively approached by pooling community resources. Union organizations are encompassing an increasing number of such plants. They naturally are interested in establishing safety, health and other standards comparable to those existing in larger enterprises. I am confident they will readily join in cooperative community efforts to improve health and safety conditions. The medical profession may very well assume significant and effective leadership in such an effort.

From personal contacts, I know that workers have a growing concern about emotionally induced illness resulting from the stresses and strains of a high tempo civilization. Their anxieties concerning continuity and regularity of employment in an industrial society where rapid technological change creates ever new work and employment situations, is seen in the growing support for guaranteed annual wage demands being made upon industry.

Dr. Seward E. Miller of the U. S. Public Health Service Division of Occupational Health, points out that "in entering the field of human relations, industry is recognizing that man's health has a mental and a social, as well as a physical, component and that these must be considered concurrently, if man is to achieve maximum well-being and productivity for himself and his employer. Both management and labor are becoming greatly concerned over the fact that emotional disturbances are responsible for at least one-third of all sickness absenteeism in industry. Consequently, new significance attaches to the worker's emotional problems—whether they arise from a domestic crisis or improper job placement, or adjustment. Attitudes can be reflected in the physical condition of the workers and, at the very least, will affect not only his morale and efficiency but also the morale and productivity of fellow employees. It is for these reasons that industry is showing promise of taking the lead in preventing and alleviating occupational factors associated with the mental, emotional and related disorders of its workers. A new area of human relations thus is developing in the field of occupational health."*

The rehabilitation of those who are disabled as a result of injury or illness is likewise of great concern to workers. Too frequently these people are left to shift for themselves. There are many restorative training programs that can be used to bring these unfortunate people back into productive work and association with their fellows that they are frequently unaware of. Here again the labor organizations can be effective instruments of communication

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*From an address before Industrial Hygiene and Medical Care Section, American Public Health Association, 79th Annual Meeting, November 2, 1951.

with these people and of health education for and with them. It is of course true, that the persons in need of rehabilitation may not, in every case, be able to work in certain jobs, or certain industries, but there are still many jobs that they can usefully perform.

Still another area of interest and concern is that of the plight of the older workers. Many of these people possess valuable skills and mature judgment and constitute a valuable resource that must not be thoughtlessly cast aside. Many are able to continue work, although added years will make them susceptible to fatigue and a higher prevalence of chronic disease. With a proper program of health maintenance and a willingness on the part of younger employees to be helpful and considerate, they too, can make useful contributions to industry and the welfare of society.

In an effort to meet, in part at least, the physical costs of accidents and illness, there has been an amazing growth of voluntary health insurance plans. It is calculated that this form of coverage, extended in large part, through collective bargaining between unions and employers, affect in varying measure, more than one hundred million people.

I am advised by responsible labor people that those who are "insured" under the prepayment plans are *not* in most cases, adequately covered and that *none* of the plans offer anything like the complete answer to the medical care problem. I am further advised that the stated durations, the quantity and quality of benefits, the exclusions, the relationship to group practice and free choice of physicians, are not only varied and largely incomprehensible to the average person, but often create a feeling of false security in the policy holder.

It has been said that "the *ideal* condition of man is one of health and wholeness" and that "every generation has to put up a new fight for its maintenance within its environment. This environment develops and changes with developments that take place in and with society. Our generation has the task of adjusting itself to a world which is reshaped and reconstituted through the impact upon man of the rapid social evolution that is taking place at an ever increasing rate."*

To the present and oncoming generations, there has been bequeathed immense resources of scientific knowledge concerning the prevention, detection and treatment of disease, that should well equip them for the task of readjustment and thus insure their survival. The effective and efficient use of these great resources requires bold and imaginative leadership on the part of the medical profession, industrial and labor leadership.

There is obvious need for further research and training in the field of medical care needs, preventive medicine and health education. It is currently estimated that industry is paying about $5 billion dollars annually into Health and Welfare Funds established by collective bargaining and in most cases, administered jointly by labor and management. It is calculated that these funds provide some sort of health protection for over nine million in-

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*Dr. E. H. Cluver, director, South African Institute for Medical Research in Social Medicine.

dustrial workers. Their existence is further evidence of the interest of industrial workers in industrial health. These funds represent a comparatively new development in union-management responsibilities.

Employer contributions to these funds have increased each year since 1929. Employees regard these contributions as money *which is theirs,* since it is provided in lieu of wages. It would seem that the extent and size of the payments diverted from the wages of industrial workers will tend to create a still greater interest on their part as well as on the part of employers in preventive medicine and maintenance of health programs.

While I am not familiar with just what is being done in the field of research or with the legal limitations under which these funds operate, it would seem entirely reasonable that some portion of the reserves be utilized for research in determining factually the health needs of industrial workers, and the formulation, development and promotion of maintenance of health programs. I firmly believe that through joint cooperative effort, it is possible to educate people *to want health* instead of being content with an absence of illness.

This is an area ripe for exploration in which the medical profession and particularly industrial physicians have a challenging role.

It has been said that "peace and happiness for the people are the objectives of good government; maximal health combined with maximal competence of the people is, or should be, the ultimate goal of the medical profession and its ancillary services."*

In their efforts to attain that goal I am confident that the medical profession and the industrial physician can, by dynamic, skillful leadership and initiative, enlist the active assistance and wholehearted cooperation of the industrial workers and the labor organizations with which they are numerously identified.

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*Sir Farquhar Buzzard in *Social Medicine and the General Practitioner.*

Summation

Robert A. Kehoe, M.D.

Director, Department of Preventive Medicine and Public Health, College of Medicine, University of Cincinnati

We come now to the part of the meeting which from my point of view is venturesome. You have had expression of ideas and opinions from several sources. It is my function, not only to act as the chairman of this meeting, but also to extract certain highlights and to compress these in the form of a summary.

Because our time is short, and because I think this can now be done better than it could in anticipation of the spirit of this meeting, I am discarding my manuscript and speaking briefly on the several points that to me seem most worthy of emphasis.

First—the problem. The task of medicine in modern life is different from that of an earlier period. I will have to ask you to take it more or less without the evidence, or to take the evidence from the supporting statements of other speakers, that that is the case. However, if I needed to put the finger on a point that might remind you that this is the case, I would speak only of one matter. In an earlier period in which medicine has dealt so successfully with problems of individual and public health, it has done it primarily through the avenues of its understanding of the nature of microbiotic disease, of the application of diagnosis and therapy thereto, and of the methods of community control thereof. This represents the principal preoccupation of the last 60-odd years of medicine. It has been done admirably, but it has largely been completed. And while that has been being done so well, a new type of community has grown up around us, and a new series of hazards, this time not those created by nature—unless you wish to include man and his acts in the sum total of all nature—but by man in his development of a new structural and economic basis for community life. From the aspects of the new hazards, we need only to look about us. Look at the newspapers, which we see so frequently, the news of which are dinned into our ears also, in addition, by the radio. They are so familiar that we fail to appreciate them. And yet they represent the phenomena with which we in medicine have not learned to cope.

The medical educator has the role, which he could fulfill if he were omniscient, of adapting medical practice to the needs of a changing community, and he has this problem in an acute stage now. It does us no good to bemoan the fact that we have not faced it sooner, but we have it now, and the need is so apparent that we can no longer evade it.

So we must head into the problem, and in doing so, we must preserve all that is best in an earlier set of disciplines, and at the same time develop new disciplines suitable to the times and needs. And as Dr. Wade and others—Dr. Wade perhaps more directly, others indirectly—pointed out, what we need is a better educated man. What we need is a better human being, an individual with broader understanding, in addition to his skills. So that we are asking medical education, as far as it relates to the education of the physician, to make up for all of the shortcomings of the other educational disciplines of modern times. We can scarcely have failed to see, in the press and in the monthly journals, in books on the subject, and by our own observations, that there are notable shortcomings in modern education, so that men find themselves well along in life before they have much knowledge of what it is all about.

We expect the physician to be a wise man, a leader and a thinker. And we must therefore, in the course of medical education, do what needs to be done to make this man, to make of ourselves and of our counterparts, this more cultivated, this more understanding, this wiser human being, who can aid in the guidance of others. By the very nature of his position the physician has the responsibility for so doing and he must be capable of doing it.

It has been pointed out by Elton Mayo and others, that the skills which we have developed in dealing with technical problems, and the magnificent achievements which have been accomplished in molding physical sciences to our use, are accompanied by a dismal lack of understanding of man and his life and background comparable to our understanding of other aspects of the natural world. We have technical smartness to a great degree, but we have social ineptitude to an even greater degree.

Likewise, medicine is capable, in its application of the physical sciences and—in a limited and mechanistic manner—in its knowledge of the biological sciences. It is much less capable in its understanding of our society and of the individual man.

Now to get down to cases. I want to talk about medicine in industry, and medicine in the community, in relation to the matters that we have been discussing this morning.

Preparation for the full-time practice of occupational medicine, or industrial medicine, lies in the field of graduate education. It is unthinkable that we should even attempt, in undergraduate education, to train the specialists in this field. The full-time practice of occupational medicine requires more intellectual competence and a greater variety of knowledge than does any other field of medical practice. Now, that may be a shock to some who are within the sound of my voice. I have no reservation whatsoever in insisting that that is the truth. The training, therefore, must be broad and sound. We are undertaking, in the course of a few years, to cultivate a man with the skills of medicine and the wisdom of social knowledge, and it is a difficult, and at the present time, an impossible task. The elaboration of the discipline by which that can best be attempted is in the process of being developed. It can be developed within our centers of medical education, if we have the people who will put their shoulders to the wheel, recognize the

nature of the job, and in their own devoted service to education and learning, assume this task. At present, the field needs charting and further development. There are, however, some trails that can be followed to a certain point, and these need to be followed by experienced teachers in more of our medical centers.

This type of training, from its disciplinary and technical aspects, undertakes to create a union between the best of what we know in clinical medicine—of the recognition and diagnosis of disease in its earliest stage, of our understanding of the biology of disease and of its therapy—and much of what we have learned in the field of public health and preventive medicine through the techniques concerned with groups. These two sets of disciplines have been employed in two different universes; so generally have our schools of public health been so separated from our schools of medicine that the two seem at times to be riding off in different directions. In industrial medicine they must come back together. This is the only means by which, with our present facilities, we can find our way around, both in clinical medicine and in public health, as these must be employed in the study of industrial populations.

It will not be feasible to introduce this kind of training into the undergraduate years in the medical schools in these days, for a number of reasons, not the greatest of which is our own resistance to change, in which there is both wisdom and also a degree of laziness. However, although we shall not be able to effect this, we shall have to extend some of the knowledge of this field to practically all who practice medicine.

And why? We have at the present time some 65 million people engaged in gainful work in American industry. Something on the order of half at least of these are engaged in work in small industrial plants, in which we cannot possibly conceive of the means of introducing full-time physicians with training in the field of occupational medicine.

This practice will have to be carried out for as long a time as anyone in this room can foresee, I believe, by physicians in the general practice of medicine—those who are in the early years of their medical practice or those in later years of medical practice who have reason to limit their hours of work, or those who, throughout a considerable period of their professional lives are willing to devote part of their time to medical service in industry.

Now, with due regard to the fact that some of the men who are engaged in this know what they are doing, it is quite fair to say—and I shall say it quite bluntly—that a large proportion of such practitioners are not doing what we know as occupational medicine. They are doing something in response to the demand of industry for pre-employment examinations—sometimes one knows not what for—or for some kind of curative service, or some kind of first aid. This, as I have said, is not industrial medicine.

What we need in the profession, and in those who are entering it, is a recognition of the fact, first, that they do not know occupational medicine, and they must learn it. Second, they must be brought to realize that in going into industry, their job is to do something in the way of preventive medicine for this great group of people in small industrial plants who do not, at the pres-

ent time, have the benefits of such guidance. These need something better than mere medical care in the conventional sense of the term. The large bulk of the practicing physicians of the country need to be aware of their shortcomings in this regard, and aware also of the means by which they can acquire that modicum of knowledge which would enable them to do well the job which they undertake to do. American medicine has prided itself on its ability to meet the challenge presented by the community. It has prided itself on doing a progressively better job. In this particular field it is not doing a good job, because it does not know what the job is. It is up to the schools of medicine to make these matters clear, and to provide at least a minimum of training for every student of medicine.

The foregoing remarks relate primarily to undergraduate medical training. I have spoken earlier of professional graduate training. This brings us to the necessity for postgraduate training. The medical schools of the country will be compelled, if they do their job in this field, to set up short courses of training which have to do with orientation, with the disciplines in this particular field, to show what the job is, not by presentation of cases of occupational disease, but by demonstrating the essential problems of the industrial community. We must consider here, briefly, some of the newer aspects of the practice of medicine, generally, in the modern community. For those of you who think that occupational medicine or industrial medicine, as we have spoken of it here, as a discipline, is isolated from the practice of medicine, and is carried on in some sort of a never-never land, into which the practitioner of medicine, generally speaking, does not enter, let me point out two or three prophetic situations.

The life of industry is not confined within industrial walls, and the hazards of industry are not confined within such walls. As we look about us at the present time, we find a community transformed into an industrial environment. Its highways have mechanical hazards like those of industrial plants. They have in them all manner of machinery, all manner of chemicals, and many of the industrial hazards, the difference being that in the household they are uncontrolled, and for that reason, the American household has, in many instances, become more dangerous than the well-controlled industrial plant.

Where are our accidents at the present time? Where are our poisons? Why should we have the necessity of setting up poison centers in the cities of the United States? Because the hazards of industry have entered the household.

We have, then, this broad problem of preventive medicine, and we have to concern ourselves with the fact that the air we breathe, the water we drink, the food we eat, and the soil from which our food is raised, are contaminated with the products of modern industry. And this situation becomes more widespread and more complicated daily, and we shall soon be adding to it the widespread potential hazard—which I believe will be well controlled because it is the one situation in which our lesson has up to the present time been well learned—namely that of radiation, which we have recognized as being so dangerous that we must not take undue risks. We have been willing to accept other risks. this one we fear. Why? Perhaps not because it is so

much more serious than others; but because it is more mysterious. In this general area, we shall have to have a broad understanding on the part of the doctors of the community, and a willingness to apply the methods of preventive medicine in the household and throughout the whole population.

This segment of medical knowledge is now reserved to a very small group of the profession, who by virtue of circumstance or of choice have found themselves isolated. This is knowledge which now must spread throughout the entire profession. There is, then, this need for recognition of the importance of occupational medicine, not only as a field into which a young doctor may enter for a career, but a field in which he is bound to be increasingly concerned throughout his entire professional life.

Last, but not least, there is the general field of medical care. Dr. Golden has spoken to us, and we have known in the past, of the interest of the organized groups in labor in an increasing, broadening, better and more economical program of medical care. This will have to come. It is not, strictly speaking, within the responsibilities of the industrial physician, whose job it is to take care of the problem within industry, and to coordinate his activities with the other medical facilities of the community that have to do with the care of the general population. But it is important to recognize that the means by which such care is provided and administered is becoming increasingly a cost which bears upon industry. When I say industry, I mean industry as represented by management and by the people who work with their hands and their special skills. This cost is becoming a very great burden, as legislation spreads, as it did more or less generally, in connection with compensation, from the eastern to the western states—it has now begun to provide compensation for nonoccupational disease—plus the fact that our industrial organizations themselves have, under one stimulus or another, set up benefit plans for nonoccupational disabilities.

The cost of this is growing and will be unbearable unless we manage to introduce the methods, the knowledge, the successful techniques of preventive medicine. And the best point at which to do this is in the industrial population, where you have groups of people—I hesitate to employ the word "captive," but—captive in the sense that they are available for study and that they are willing. And in these areas we shall find, through the development of the appropriate methods of epidemiology and clinical study, the answer to many of our problems of preventive medicine and disease in general. Unless this is done, we shall find ourselves in chaos with respect to the problems of medical care and the economies of the provision of medical care for our population.

We, in medicine, must needs open our eyes, recognize that we live in a new world, and one which we but slightly understand. We in the field of medical education have the still greater responsibility of anticipating, if we can, and of applying, if we can, those things which will keep us within reasonable limits of safety and security as a society.

DINNER MEETING SESSION

TUESDAY, DECEMBER 6, 1955

Dr. Ward Darley, president of the University of Colorado, at whose suggestion this conference had been convened, was unfortunately unable to be present. His prepared address entitled *The Widening Horizon of Medical Education* was read by Dr. Joseph C. Hinsey, Director, The New York Hospital-Cornell Medical Center, who is also chairman of the Finance Committee of the Association of American Medical Colleges.

The Widening Horizons of Medical Education

Ward Darley, M.D.
President, University of Colorado

THE HORIZON of American medical education is a wide one and one which, if it is to be understood, must be viewed against the panorama of this country's development.

Richard H. Shryock[1] has very ably reviewed American medical research in the light of our nation's history and much of the historical information and organization that I will use in this paper has been gleaned from his book "Medical Research."

Apprentice training represented the earliest form of American medical education. This type of training did not disappear until about 1820, and its influence in practice remained until after the Civil War. The proprietary medical school made its first significant appearance in the early 1800's, flourished in the post-Civil War days and persisted until the early part of this century. There are still physicians in practice who received their training in proprietary schools.

While a few colleges had started medical schools as early as 1765 and a few hospitals had been designated for use in medical teaching as early as 1773, these efforts did not contribute much to improve the over-all picture of medical research, education or practice until the Johns Hopkins Hospital and Medical School opened in 1889 and 1893 respectively. The Johns Hopkins demonstration added great impetus to the demand for reform in medical education, but in spite of this, the proprietary schools continued to dominate the picture until the early 1900's. In fact, during the period 1840 to 1900, it is estimated that only 5 per cent of the graduates in medicine had had the advantage of supervised clinical study and experience before taking responsibility for private patients.

By 1907 the American Medical Association had begun to inspect and rate

medical schools. When it was apparent that this effort was to bear little fruit, the aid of an outside agency, the Carnegie Foundation, was sought. The study made by Dr. Abraham Flexner, the popular acceptance of his report and the fortunate results upon the picture of medical education are well known. The proprietary school disappeared in favor of the university-controlled medical school-hospital combination. Admission and educational standards were raised accordingly. Coincident with this reform, the internship was established and formal hospital training for specialty practice began to make its appearance.

The outcome of all of this development is that today we enjoy a system of education governed by standards that are being kept as high as they can be pushed. All levels of education are involved: preprofessional, undergraduate, graduate and postgraduate.

The story of medical education, which I have barely outlined, did not just happen. Many background developments were necessary: the growth of American research; the strengthening of the American university and hospital, and finally, and very basically, socio-economic developments which made possible adequate financial support for research, hospitals and universities.

Prior to 1900, American investigators, with a few notable exceptions, contributed relatively little to medical knowledge or systems of thought. Both medical knowledge and thinking were largely of European origin and were brought to America through the medium of a few journals and American doctors who went abroad for postgraduate study. The significant thing is that as we approached and turned the 20th century, America was ready to use these European developments as the foundation of a system of medical research, education and practice that was eventually to eclipse other medical activity throughout the world.

What of the American social and economic background for first, lack of progress, and second, marked progress?

It was well beyond the year 1800 before the colonial influence finally spent itself as a force in our national life and before our independence from English and European industrial and economic thinking was established. During the pre-Civil War era, our own industrial economy was under way—not as the result of planned experiment and development, but rather as the result of cumulative craftsmanship to which could be added a few discoveries, most of them empirical.

Following the Civil War, the same factors continued to play but to them were added the influences of a rapidly developing philosophy of "rugged individualism" and the exploitation of fabulous natural resources. Uncontrolled commercialism and the indulgence of self-interest were the result. During this time the country was gradually changing from an agricultural to an industrial economy. The population increased at a prodigious rate as did also private wealth, and both were concentrating in our growing cities.

Our individual and community environments were becoming increasingly complex, and it could only be a question of time before planned development would enter the picture. It is to the credit of our American financiers

in that around the turn of the century they initiated a semblance of voluntary control and began to set up a machinery for the return of private wealth to society. The Johns Hopkins Medical Center was endowed by the man for whom the institution was named. The General Education Board, the Rockefeller, Carnegie and other foundations were organized. In fact, by 1942, the Directory of American Foundations listed 283 corporations dedicated to the support of educational and related activities. The organization of the National Fund for Medical Education in 1949 and its support by American industry and corporations is the latest and most significant of this kind of development.

World War I, the depression of the 30's, and World War II with its aftermath of economic controls, inflation, welfare legislation and high taxes could not help having tremendous repercussions upon our national and private way of life. Personal independence as our grandparents knew it has become a thing of the past. Aside from abidance by the many rules and regulations that govern every day life our dependence upon things and people for the essentials of living is something that was not very apparent 50 and more years ago. A war in Europe took several months to have any appreciable effect on "great granddad" and a coal or a railway strike would probably not have bothered him at all. Today a war in Europe affects each of us even before it appears and a coal or a railway strike limits our personal and community activities immediately.

Every phase of American medical education has its explanation in our socio-economic history. The apprentice training in medicine which developed during the early colonial period had its counterpart in the same practice in the other crafts and guilds. The proprietary school of the 19th century was a decidedly American innovation that reflected the *laissez-faire* peculiar of the time. The faculties of the schools were engaging in competitive business, exploiting the students and the public without regard for the consequences as far as standards of practice or public confidence were concerned.

The demands for reform in medical education and practice coincided with similar demands in the socio-economic and political fields. These demands came at a fortuitous time. Private wealth was ready to move to the support of universities, libraries and hospitals. Our growing cities were concentrating clinical teaching material and academic and professional personnel. In Europe, medical knowledge and scientific methods had reached the point where they were ready for the large scale developments only possible to the resources being developed in America.

American medical education was coming to a sense of direction at the same time that American socio-economic development was reaching the stage of more intelligent planning. Standards of medical education and practice were being raised at the same time that American enterprise was beginning to stress efficiency and to develop ethical standards of conduct.

All of this culminated in the reaction of American medicine to the Flexner report of 1911. As a general pattern our medical schools began to add full-time faculties, to develop *good* teaching hospitals and clinics and to in-

corporate medical research into their responsibilities. As a result the body of medical knowledge began to develop more and more rapidly. In order that this knowledge be put to work, more years were added to the medical curriculum. Then the internship and finally, when the spectrum of medical knowledge became so broad that no one person could possibly absorb it all, medical specialism began to develop and with it began to come group practice, the private clinic and the medical center.

Now permit me to look back and attempt to assess the impact which American medical education has had upon our national life.

Basically, the answer rests upon an estimate of the effectiveness of the output of the schools—the research, the doctors. The two cannot be divorced. New knowledge raises the standards of education; effective education results in the discovery of new knowledge; new knowledge and effective education are essential to the improvement of service. The impact of American medical education upon society, then, must be sought in terms of the effectiveness of medical care and in terms of public appreciation of the importance of medical care. We can only take a brief look at the evidence.

An analysis of the impact before 1900 is relatively easy, for there was little if any that was significant. Neither the apprentice training of the 1700's nor the proprietary schools of the 19th century produced practitioners who were expected to excel those from whom they learned. As a consequence, neither medical education nor practice had a savor of their own.

But from the vantage point of 1955 the evidences of the last 50 years of increasingly effective medical service are numerous. I can only illustrate. The average human life span has been increased from 49 to 69 years. While our high standards of living are playing an important part, the lowering of infant mortality, the virtual elimination of epidemics and the control of most infectious diseases constitute the chief factors in this accomplishment.

Progress in surgery based upon advances in the prevention of post-operative infection and shock, upon progress in anesthesia and upon technical discoveries that give increasingly easy access to the body cavities is beginning to be of importance in the same regard. The significance of this statement is brought out by comparing the mortality from wounds in the United States Army in two world wars: 11 per cent in World War I and 3 per cent in World War II. The difference cannot be accounted for entirely upon the basis of the availability of sulfa drugs, penicillin, plasma and blood. In the last war medical men in the armies of our allies had these same advantages but their post-wound mortality rate remained at the World War I figure of 11 per cent. I believe the difference is accounted for by the fact of the American doctor's superior training in the practice of surgery and medicine.[3]

The degree of public acceptance of medical care can also be taken as evidence of the fact of medicine's effectiveness. The mere enumeration of examples should serve to emphasize this point: The increase in the use and the increase in the number and kind of hospital beds; the development of public health services at all levels: federal, state, city and county; the

increasing popularity of hospital and health insurance plans; the establishment of health services in business, industry and schools; the appearance and successful development of volunteer health agencies, and finally, the clamor on the part of young people to be admitted to our medical schools.

It is logical that increased effectiveness would be paralleled by expanding service activities and facilities. In 50 years the effectiveness of American medicine and all that goes with it has developed to the point where it probably now stands among the nation's first 10 business enterprises. This fact alone should be considered as a socio-economic development of no little consequence.

As we view the future, what are the implications of the interplay between the health and socio-economic changes that are now so rapidly taking place? I do not pretend to be the oracle that can discuss this with any finality but I believe that certain of today's trends do permit some fairly obvious generalizations.

One of the most important things has been the economic consequences of the increasing number of older people in our society and the resulting trend toward compulsory retirement at the early ages of 60 and 65. These two factors have played an important part in the development of pension and security plans under the sponsorship of federal and state governments, corporations, unions, fraternal organizations and private insurance companies that are involving billions of dollars.

The same can be said for the health and hospitalization plans that are being operated by Blue Cross, Blue Shield, corporations, unions, fraternal organizations and private insurance companies. I think we can rest assured that this type of development will continue and that the time is not far away when the entire spectrum of health and medical care—care in the doctor's office and the patient's home as well as in the hospital; preventive care, the care of all types of chronic illness, rehabilitation as well as the care of hospitalized acute illness—will be provided for under the principle of the shared risk.

Another thing that can be pointed out here is the growing importance of chronic disease and its consequences. Chronic disease and disability have been steadily increasing over the past several years and can be expected to increase even more in years to come. Part of this is associated with the increase in the number of old people—chronic disease and disability increase in frequency in this age group. Another reason for the increase in chronic disease and disability is the fact that due to wonder drugs and wonder surgery, deaths from acute illness and injury are frequently prevented and are being replaced by residual or chronic disability. In other words, deformity and disability are frequently being substituted for death. As Alan Gregg has said, "We are trading morbidity for mortality."

Theoretically this increase in the number of chronically disabled persons should add to the financial burden of society. This need not be so as has been amply demonstrated by what can be done through the practice of rehabilitation—a new specialty that has come out of World War II. This development has shown that the vast majority of chronically disabled

people can be treated and taught so that they can be significantly if not completely self-sufficient.

Lack of time will prevent my indulging further in detailed speculation. Obviously there will be many health angles to other social, economic and political questions that will face us as time goes on. As in the past, many of these will result in tensions and anxieties that will be of health significance. There is another thing that I can only mention and that is that as public health and medical knowledge, much of it "made in America," begins to be applied in the underprivileged nations throughout the world, the social and economic impact as the result of peoples with lower death rates, better health, more energy and a yen for competition is going to be something of tremendous significance if we are to hold our place on the world's socio-economic stage.

I now come to the final section of my discussion, which is the consideration of the future responsibility of the medical educator, and of the impact which medical education will have upon American society. The success with which we meet tomorrow's health problems will depend upon the research and personnel output of our institutions concerned with all types of medical training.

During the past 50 years medical research has primarily been confined to the laboratories, wards and clinics of our teaching medical centers. Medical research is now beginning to take on a much broader aspect and is moving into the community in the form of surveys, statistical studies and even controlled experimentation. This is necessary if significant trends in morbidity are to be appreciated and if the ultimate causes of health and disease are to be studied. Definite knowledge regarding these matters, translated into the prevention and control of disease, is essential if medicine's effectiveness is to satisfy the demands of the future. Research of this nature will extend beyond the campus of the medical center and, while our institutions will continue to be active parties in the work, in many instances other agencies, both governmental and private, will be involved. The part here that business and manufacturing concerns can play will be of the first importance. The financial support of the projects will be as varied as their advocates. This will not minimize the responsibility of medical education for providing the leadership for research. This is a safe statement because our institutions concerned with medical education are the chief source of trained personnel for medical research regardless of where it is done or the source of its financial support.

In addition to manpower for research, the provision of personnel capable of meeting the peculiar demands of future health service and medical care poses the second principal problem for our medical schools. The consideration is both quantitative and qualitative.

Currently the question of quantity, that is particularly the number of physicians this country needs, is involved in controversy. Regardless of who is right or wrong, I think it is safe to say that if the health and medical service of tomorrow meets the approaching challenge inherent in the promotion of health and the prevention and more effective control of disease,

and that if our institutions of learning adhere to high admission and educational standards, there is very little danger of overproduction. I also think it is safe to say that the limited finances that are limiting the size and development of our academic and research staffs, the acquisition of equipment and the expansion of physical plants are preventing our reaching the potential of which we are capable.

The question of personnel quality is just as important, if not more so, than the question of quantity. I believe that the kind of professional, technical and administrative personnel needed for tomorrow's health and medical service is not too difficult for us to visualize today. I have just indicated that I thought tomorrow's service would demand capacity in the promotion of health and the prevention of and more effective control of disease. I believe that progress in research will be such that an effective performance in these areas will be possible. The most basic problem in education, then, will be to select and train individuals to the capacity necessary to put this knowledge to work just as rapidly as it is developed. In addition to this, the training experience must be such that leadership for the intelligent and effective cooperation of the public will be provided.

In short, if the broad field of medicine is to continue to have a significant and positive impact on American society the gap between what we know and what we do must be kept as narrow as possible. Since, in the last analysis, our medical schools hold the key to both the discovery and dissemination of knowledge, the width of this gap is a direct reflection of the effectiveness of our institutions in the training of our doctors, medical scientists and of those who work with them.

Obviously, I cannot go into the details of the educational programs necessary to accomplish these ends. I can, however, tell you that in general our medical educators are cognizant of their role and responsibilities. They are looking to their selection methods and to the basic philosophy and *modus operandi* of their educational programs. They realize that they can no longer give complete training for the responsibilities of independent medical practice in the four years of the undergraduate period. They are looking to the re-evaluation of the internship with the intent of seeing that it is related more definitely to the undergraduate curriculum. They are beginning to see the place of specialty training and practice in a more realistic perspective and in connection with this they are beginning to realize that a general manager type of physician must begin to play a dominant role in our health and medical service. The training of this physician is implied in the manner in which he will probably function. It is my thought that primarily he should be qualified to serve as the health counsellor throughout the entire life span of any given individual. His function will be to maintain and promote health as well as to prevent or combat disease. He must be an astute diagnostician, particularly if he is to recognize and intelligently control significant disease in its beginnings. He must be well trained in mental hygiene and clinical psychiatry. The greatest single challenge facing medicine today is in the field of mental health. His training in the medical and surgical specialities need go only far enough

to give him an understanding of their diagnostic and therapeutic concepts, and so that he readily recognizes his limitations and uses the specialists as consultants and helpers whenever necessary. In short, one of the fundamental responsibilities of this physician will be to guide his patients through the complex structure of medical care. Where is this kind of physician more needed than in industry, particularly if he can be given whatever additional training he needs in the field of industrial medicine?

Last February I pointed out[3] that the industrial or commercial concern employing large numbers of individuals plus the communities in which these individuals live, should constitute the near perfect laboratory in which the effectiveness of preventive medicine can be demonstrated. I pointed out that here is the cooperative situation in which health inventories, case finding programs, early treatment and programs of health education can easily take place.

My reason for suggesting a conference such as this was the hope that the challenges for the physician in industry might be delineated and emphasized. I realize that when I made this suggestion I only went half way. So I hope that this conference will fill in what I failed to suggest, namely, that it delineate and emphasize the challenges that should attract industry into supporting the kind of health service I have just implied. I feel that if we can properly relate these two challenges and see that this relationship is generally understood, the potential for good can be without end.

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2. Johnson, Victor: "The Mission of a Medical School," *The Rocky Mountain Medical Journal*, Vol. 44, pp. 116-122, February 1947.

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PANEL SESSIONS

The conferees were divided into four panels—two whose assignment was to explore the education of physicians for industry at the undergraduate level, the third whose assignment was postgraduate education and the fourth whose assignment was graduate education. The panels held three sessions on the afternoon of December 6 and all day, December 7. The panel reports, delivered on December 8, appear on the following pages.

Undergraduate . . . . . Page 47
Postgraduate . . . . . Page 54
Graduate . . . . . Page 58

A list of the panelists will be found with each report.

Joint Report of the Panels on the Training of Physicians for Industry at the Undergraduate Level

Duncan W. Clark, M.D. reporting

PANELISTS:

PANEL A	PANEL B
Stewart Wolf, M.D., chairman	E. A. Stead, Jr., M.D., chairman
Duncan W. Clark, M.D., recorder	E. Hugh Luckey, M.D., recorder
Max R. Burnell, M.D.	Elston L. Belknap, M.D.
C. H. Hine, M.D.	Ronald F. Buchan, M.D.
Joseph C. Hinsey, Ph.D.	L. E. Curtis, M.D.
Robert C. Page, M.D.	Samuel B. Harbison, M.D.
Edward L. Turner, M.D.	Arthur F. Mangelsdorff, M.D.
Leo Wade, M.D.	Norman Plummer, M.D.
Roger Williams, M.D.	Samuel Proger, M.D.
Rodney R. Beard, M.D.	George M. Saunders, M.D.
Stanley E. Dorst, M.D.	Louis W. Spolyar, M.D.
J. Wister Meigs, M.D.	J. H. Wagner, M.D.

The two panels on undergraduate education held their discussions independently during the two days of the meeting. The leaders were then asked to consolidate the main points into a single report. The compromises necessary in such a consolidation have robbed the report of some measure of freshness and vigor as well as of considerable steam.

STEWART WOLF, M.D.
Chairman, Panel A

DR. KEHOE and members of the conference: As you know, there were two panels that considered undergraduate medical education, Panels A and B. These were under the respective chairmanships of Dr. Stewart Wolf and Dr. Eugene Stead. I think either one would have been a more appropriate person to present the report. We had a prolonged elimination contest in determining who would present the report. When one of the recorders left, I was outvoted and my services were volunteered for this purpose by the two chairmen.

Late yesterday afternoon the two chairmen and the two recorders and the supposed reports of their respective panels collided. Our purpose was to produce something equivalent to unity, but as you have long suspected, two plus two equals four. Consequently, the printed report contains only selected items on which there was minimal agreement in common or what certain of the panelists wished especially to bring to your attention.

Since the reading time of the report is only five minutes, I have been given permission to add such comments as may capture to a fuller degree the exchange of discussion and what went on in at least one of the panels. As a result, most of what I will have to say is not in the printed report but will take its cue from certain selected sections in it.

When we began our working conferences last Tuesday afternoon, I am sure many noted upon entering the Mellon Institute that elsewhere on one of its floors a seminar was in progress on celestial chemistry. Fortified by the example of the courage implied in taking on such a subject, we opened with an attempt to examine an equally difficult, if more mundane subject, namely, "What is an industrial physician?"

This seemed a rather logical first question for a medical school if it is going to present the field of industrial medicine to its students and to identify its practitioners, but it will interest you that we were unable to define what is an industrial physician in terms that all would accept. Our failure isn't so important as were the reasons that surrounded it.

Our debate over "What is or who is an industrial physician?" centered upon the effort to specify the minimal characteristics that would warrant the designation. It was denied by some that one is an "industrial physician" simply by virtue of his employment by industry for medical services that are usual and identical with those he provides in ordinary private practice. But there were others of us who saw in this an implication of exclusiveness, or, at least, the appearance of it, that in its practical effect would be limiting to the present necessary efforts to reach and advance physicians so engaged in part time industrial activity or otherwise performing medical functions on behalf of the industry.

It was thought that this, too, would be limiting to the faculties of medical schools who need address themselves to responsibilities for the postgraduate education of physicians. And, incidentally, in this comment there is no intent to imply that the panelists had any disagreement over the status and recognition of the part time physician offering predominantly preventive and health promotion services.

Finally, the effort to define "What is an industrial physician?" was abandoned in favor of a supposedly more neutral topic, "What is occupational medicine?" There was rather quick agreement on this, and we conceived the field as follows: That occupational medicine is concerned with the prevention of disease, the maintenance and promotion of health of employed persons in a group setting, as well as the health of the community as it is affected by the industry, and the health of consumers as affected by its products.

The concepts contained in this definition at least identify the primary areas of responsibility of one who would practice occupational medicine either full time or part time.

Other elements that found varying degrees of support among the panelists included the treatment of diseases arising out of the industrial environment, and rehabilitation. There were some who would add other ranges of therapy, depending upon local and possibly upon transient health needs of the population under care.

This definition of occupational medicine, however useful it is in identifying the main elements most necessary in modern occupational medicine, did not serve to resolve the differences of opinion on the status of physicians who are in industry but may not be thought to be of it.

This has considerable meaning to medical education and its obligation in the preparation of students. The fact that we were told that something like 70 per cent of the working population are in small plants, and the majority must be cared for on the job by nonindustrially qualified physicians, is a poignant and sobering thought.

In considering further the question of the industrial physician, and especially the recruitment of industrial physicians, there was concern about an apparent lack of interest by students in entering the field. It was suggested that this might be due to the fact that the physician in industry is concerned principally with problems that seem intangible to the medical student and that there might be lacking in this practice, in the mind of the student, the satisfaction that goes with the continuing treatment and care of a patient.

Not noted in the report is still another explanation, and that is that possibly we don't present well what the field actually is. For this reason it was evident that it is necessary to give the student of medicine a quite full picture of the range of the medical interests that characterize industrial practice.

We were indebted to Dr. Beard for suggesting a trim outline of the range of functions of the industrial physician, which are listed as follows—activities he pursues obviously with the help of the allied health professions:

First, curative services, meaning by this either first aid for occupational and nonoccupational injuries and illnesses, and definitive care for occupational disease.

Second, preventive services of a medical nature in a range of things with which you are quite familiar: job placement examination, periodic medical examination, health education of both group and individual type, specific preventive measures, and epidemiology.

Third, preventive services of an environmental nature: general and special sanitation, accident prevention and community health.

Fourth, the administrative function: the maintenance of records, advice to management on policy formation and so forth.

There were some panel members that felt that "curative services" should be listed last, in order to preserve the proper emphasis on the primary functions of one who is an industrial physician.

A further commentary was added from one of the panels that had a bearing on one of the above functions. In the absence of a well described picture of the field of industrial medicine, and with only limited opportunity to view its techniques in action, medical students may be unduly impressed with certain special programs practiced in their particular locality. There was in this regard a view expressed by some that a major impact of industrial medical practice on the medical school and on medical education is already evident in the periodic health evaluations done for industry by teaching hospitals. The growing demand for this, it was thought, may threaten the absorption of medical services and facilities to a degree that imperils the current supply. Moreover, there was doubt in the minds of some as to the validity of the periodic checkup when conducted as an elaborate routine. Students, who learn largely by precept, may even conclude that, because these examinations are done in a teaching hospital, they constitute an ideal form of medical practice.

Then we turned to the aims of medical education, particularly with reference to industrial medicine, and the question was raised: "Leaving out of consideration the qualified full-time industrial physician, who is a product of graduate training, is there any need for the undergraduate curriculum to do more than provide a good fundamental training in medicine and other standard fields; or should new contents be brought into the curriculum to serve the needs of those who will practice industrial medicine without being industrial physicians?"

The response was strongly in the affirmative.

This, of course, is not to ignore the value of the Association of American Medical College's set of recommendations on the objectives of medical education, the fulfillment of which in preparing the student for medicine would obviously solve many of the present difficulties in industrial as well as other forms of medical practice. Nor does this belief that other things are needed discount in any way the valuable contributions that are currently being made in the growing number of comprehensive medical care demonstrations in many of the medical colleges. These are of recent vintage and may not be familiar to some of you. The attention in such demon-

strations to the study of the ambulant patient, and the family in the home, and the opportunity for the cultivation of appropriate attitudes in rendering health services—these have obvious implications to the training of future physicians for all types of practice.

Consequently, a further refinement of aims, specifically with reference to industrial medicine, was sought. It was noted and stated very well, I thought, by Dr. Meigs: that the contribution of the industrial physician may reside especially in his ability as a student and observer of human function. The effective functioning of man in society, as a recognized goal, is in some ways a peculiarly American trait. The doctor is expected to contribute to this by helping each individual use his physical, mental, social, and even spiritual capacities to the maximum. Every medical student, it was thought, should be taught to take a history in terms of function, that is, how and to what extent the patient has used these several capacities in the past. Only when a physician knows how a patient has used his capacities in the past can he understand the present disability, or advise wisely regarding the patient's future opportunities to function as a whole person.

It was realized in this, of course, that the occupational is but one of many spheres of functioning. But disturbances in other spheres of life bear on efficiency on the job, and commonly result in consultation with the industrial physician.

There then followed a critical analysis of quality of history-taking among physicians and the need for improvement in the instruction of students in this skill. Just as psychiatrists have in recent years contributed to this form of instruction, so too might physicians oriented to the problems and needs of occupational health add their perspective.

The aims of a curriculum that would give due recognition to occupational medicine are implicit in the specific suggestions on content offered by one of the panels. These include at least the following: instruction in what industrial medicine is; the organization of industrial health services; workmen's compensation laws and practices; the responsibilities of the physician in reporting and certification; and only a general understanding of what constitutes the occupational environment, its variability, the nature of occupational hazards, and where in the community the doctor need look for expert help for such problems.

The mere mention of the subject of the requirements on the doctor for reporting and certification of disability touched off a critical discussion of the temptations to abuse in this practice. It was thought that failings on the part of some physicians are a threat to the profession as a whole and even threatening to its perpetuation as a profession.

In the instruction of students, it was recommended that the practice of ethical medicine be taught as a concrete necessity of good medical care, aside from the still more fundamental reasons that such be done.

On the question of where such instruction should be provided, it was agreed that occupational health should be the concern of all departments of the medical school. But in view of the preventive and constructive aspects of occupational health, and since the subject deals with groups, it would

seem that generally and usually the department of preventive medicine and public health should be responsible for the basic orientation and presentation of the subject. Further, clinical departments should emphasize and exploit the occupational aspects of disease as their regular responsibility; otherwise, the earlier introduction will have been in vain.

I would like to make reference to a recent meeting of the Association of Teachers of Preventive Medicine on the subject of occupational medicine, which was held less than a month ago. I think it a manifestation of the increased interest of teachers of preventive medicine in their responsibility in this.

This group has been meeting for approximately 12 years. Never previously, to my knowledge, had they devoted an entire meeting to this subject. I think you will be pleased to hear that this was the largest and best attended meeting we have ever had. You might say, "What can you accomplish in a one-day sprint?"—because it was only a one-day meeting, but a rather unusual effort was made to prepare and annotate an extensive agenda and bibliography, something close to 50 pages of material distributed in advance to the 10 round tables. This may seem a lot, but it was mainly an effect of enlisting the thoughts of many participants prior to the meeting itself. In all, 10 teachers of preventive medicine were appointed chairmen of round tables and invited to form local committees of adjacent teachers of preventive medicine and to arrange the agenda they wished.

Some organized local committees; the majority did not. The majority, and it should be no surprise to you, called upon those in their local community who were experts on the subject of industrial medicine, and this had the effect of making new connections and associations for certain of these teachers.

They invited certain of their associates to open discussion on different points of the agenda. The net effect was that many teachers who had not given a great deal of attention to this subject in the past have had their interest aroused in it. The focus was not on what to teach and how to teach it, but the focus was this: "What are the most interesting aspects of industrial medicine? What are the most interesting things in your experience?" The supposition in this, of course, was that our interests would be aroused by a better understanding of what is of concern to you, particularly in those areas of your practice most adjacent to what we normally teach in preventive medicine and public health.

Accordingly, we held round tables on such subjects as absenteeism and productivity, employability and employment, rehabilitation, medical care, the prevention of disease, disability evaluation, disease prevention and so forth.

A noteworthy point was that we invited approximately 30 physicians, representative of industrial medicine, to come and serve as resource consultants to us. Their response was extremely generous and they were very helpful in the preparation of some preparatory materials. In all, I think this a good sign and manifestation of the degree of interest that teachers of preventive medicine have in this field.

Turning now to the question of how the teaching of industrial medicine should be presented or integrated, several examples were cited of schools where staffs competent in industrial medicine took part in the instructional program of a variety of other departments' work. It is not just a matter of contributing subject content but that of imparting attitudes as well. For this reason, very often industrial physicians are asked to take part in the out-patient teaching, and this is a very useful role and place for them to assist.

We had examples of extra-mural field trips, and even in one instance the opportunity for students of examining employees in a sheltered work shop with the object in part to consider job design and the capacities of handicapped persons to perform in them.

There were several other suggestions with respect to the recruitment and the source of the industrial staff that might assist. It was suggested it is a useful, and I think a common practice, for medical school teachers to be invited into the industrial setting as consultants or lecturers. This is a two-way street and we were also told of a practice of industry employing half time in their service, for clinical purposes or research, or both, a man who would spend the remainder of his half time as a teacher and investigator in the medical school. In addition, the increasing use of graduate students and fellows seems to have promise of another useful source of teaching personnel.

In reorganizing the curriculum, or in making the adaptations that are necessary, it was thought that extensive adaptation of the curriculum is probably not necessary; there is necessary a shift in emphasis in the department of public health and preventive medicine and the utilization of opportunities of teaching the principles of industrial medicine as they arise in all of the clinical fields.

There are specific meanings in all of this to a faculty. There is the necessity of increasing the awareness of the faculty in this general field.

One final point: It is obvious that occupational medicine, itself, is co-extensive with all of medical practice and on this account lends itself to rather easy incorporation in the existing framework of the medical curriculum. In the design of curricular adaptations toward this purpose, the body of knowledge that students must learn and the associated attitudes they need to develop stand to gain in generous measure by adding the dimensions available from those who are students of the relations of occupation and health. Thank you.

Report of the Panel on the Training of Physicians for Industry at the Postgraduate Level

Robert O'Connor, M.D. reporting

PANELISTS:

Robert O'Connor, M.D., Chairman
L. J. Goldwater, M.D., Recorder
P. N. Barton, M.D.
D. C. Braun, M.D.
C. A. D'Alonzo, M.D.
O. M. Derryberry, M.D.
D. H. Goldstein, M.D.
W. D. Holden, M.D.
M. W. Joez, M.D.
N. J. Roberts, M.D.

THIS REPORT represents the conclusions of the discussion group regarding the subject of postgraduate education in industrial medicine.

Postgraduate education was defined at the outset as any and all attempts at programs of education apart from those usually designated as undergraduate or graduate. The intended audience for such educational efforts was divided, for discussion purposes, into three groups: physicians who have no industrial affiliation, physicians who have a part-time affiliation with industry, and full-time physicians who are seeking "refresher" or special subject reviews. It was early apparent in the discussion that there is a large segment of practicing physicians who are quite unaware of the real nature of modern industrial medicine and, indeed, who are not at all interested in learning about it. It was felt that some sort of approach to this group could be valuable but the problem of interesting such physicians to attend a discussion of industrial medicine was a difficult one. It was felt that he might best be reached in the normal channels of his hospital or medical society relationships. Two particular avenues were explored:

1. That of having the regular meeting of the local medical society in the plant at the invitation of management with a planned program and tour.
2. Reaching him in the regular hospital staff conferences.

Other possibilities of stimulating interest and understanding might be a placement service operated by a county medical society, activity from manufacturers' associations, and the like. It was generally agreed that any attempt at a forml program labeled as industrial medicine could expect very poor attendance on the part of these physicians.

A discussion of M. D. Day in the plant led to three things deemed worthy of emphasis:

1. That occupational medicine does not compete with private practice but works in close cooperation and, indeed, is a referral agency for the private practicing physician.
2. That industry has a legitimate interest in employee health and the establishment of effective preventive medical programs in industry.
3. That in many ways, the industrial physician can be of material assistance to the private practitioner in work assignment for his patient, in understanding the occupational exposures, in referrals of cases and many other ways.

It was felt that anything resembling propaganda or criticism should be avoided in such sessions. Other ways of reaching the physician without an industrial affiliation were reviewed. Suggested methods were through:

1. Joint action between a local medical society, a medical school and the Academy of General Practice.
2. Organized medical groups such as the American Medical Association's Council on Industrial Health, Industrial Medical Association, American Academy of Occupational Medicine, and American Academy of General Practice.

3. Medical periodicals.
4. Voluntary health agencies.
5. Foundations.
6. Chambers of commerce.
7. Official health agencies.
8. Insurance companies.

It was recognized that there must be a coordinating body to plan and execute any programs using as channels one or more of the organizations in the above list.

The second group, the physicians who have an interest in industrial medicine or have part-time affiliation with industry, were deemed much easier to reach and more interested in learning opportunities in this field. A number of different approaches to this group were considered possible. Some of them are:

1. Teaching institutes of one to five days up to two months.
2. Courses offered on a weekly basis for a period of four to twelve weeks.
3. Barnstorming programs using individual instructors or groups.
4. Night courses.
5. Summer courses.

It was recognized that the nature of the teaching program must be governed by the local conditions.

Whether the course is long or short, it was felt by the group that basic course content should include the following:

1. General principles and scope of occupational medicine.
2. Medical policies in industry.
3. Organization and administration of in-plant programs including administrative relationships.
4. Staff.
5. Facilities.
6. Procedures and programs.
7. Special problems and techniques, including such things as absenteeism, sickness benefits, workman's compensation, professional relations with outside physicians, safety, industrial hygiene, occupational disease control and clinical problems.

Depending upon the length and depth of the course, additional course content might include specialty problems in related fields such as dermatology, x-ray, ophthalmology, surgery, etc. Certain general conclusions were reached regarding teaching methods. It was considered most desirable, wherever possible, to use clinical material and a case presentation. Where considerable material must be presented in a short time, lectures are necessary, but where time is available, seminar discussions and the case teaching method was considered preferable.

The full-time physician who seeks additional training either for broader orientation or for study of specific subjects has available to him now many good presentations in a variety of locations. The committee considered that the need for this group was presently being met to a considerable degree and the remainder of the discussion period dwelt upon the problem con-

fronting those who have met the qualifications for admission to examinations by the specialty board in occupational medicine but might well be in need of further study opportunities, particularly in certain aspects of preventive medicine, such as epidemiology, biostatistics, etc. It was felt that this was a temporary need but one that should be met. The group unanimously agreed that anything resembling a "cram" course organized primarily for the purpose of preparing candidates to pass examinations is to be avoided and actively discouraged. Candidates should be guided in procedures for preparing themselves to take the specialty examinations. It was felt that such guidance would require a minimum of a two-week course with the understanding that it would represent orientation and guidance for the physician to help him to pursue further his own studies of those areas in which his knowledge needs strengthening. It was felt that there would exist in this situation a need for instruction in some of the basic sciences of public health such as biostatistics, epidemiology, communicable disease, sanitation and environmental medicine.

Consideration should be given to publication of a list of suggested reading to assist those who are preparing to take the examinations. It was thought that it might be desirable to stimulate preparation of a series of articles dealing with those topics upon which the candidates will be examined and to include in those articles appropriate reading lists. It was further considered that graduate schools in the very near future should prepare themselves to meet this educational need and to furnish assistance to specialty board candidates.

Because of the responsibilities of most industrial physicians, it was felt that few would be able to attend such courses of guided study for longer than a two-week period. For those able to participate in courses of longer duration, it was suggested that modification of some of the existing two-month courses might be needed to meet this specific need.

Representatives of teaching institutions who were present showed a keen interest in cooperating and participating in these special courses.

Report of the Panel on the Training of Physicians for Industry at the Graduate Level

A. G. Kammer, M.D. reporting

PANELISTS:

A. G. Kammer, M.D., Chairman

Frank Princi, M.D., Recorder
Wright Adams, M.D.
William Ashe, M.D.
Lamson Blaney, M.D.
D. John Lauer, M.D.
O. Tod Mallery, M.D.
Norton Nelson, Ph.D.
Ralph Schneider, M.D.
Lamar Soutter, M.D.
Arthur Vorwald, M.D.

THE PANEL ON graduate education carried on discussions on five items pertinent to graduate education in occupational medicine: 1. definition and scope of occupational medicine; 2. the graduate training curriculum; 3. standards and approval mechanism; 4. training facilities; and 5. the present situation. Each of these was considered by a small sub-panel which had the responsibility to develop a semi-finished statement which, in turn, was fully discussed by the entire panel. Our final product is a statement on each of the five agenda items, all of which have the concurrence of the full panel. The five statements appear below.

I. Definition and Scope of Occupational Medicine

A. Definition:

"Occupational medicine is that branch of medicine which deals with the relationship of man to his occupation, for the purposes of the prevention of disease and injury and the promotion of optimal health, productivity and social adjustment." Considerable discussion was devoted to the question concerning whether industrial medicine and/or industrial health should be included in the definition. It was felt that these two terms were implicit in the general understanding of the words "occupational medicine."

B. Scope of Occupational Medicine

1. Preventive and constructive medicine
   a. Clinical measures to prevent disease and disability and to promote optimal health.
   b. Environmental control for the promotion of health, comfort and productivity.
2. Curative medicine
   a. Care of the sick and injured at work, and their rehabilitation.
   b. Management of occupational diseases.
3. Administrative medicine
   a. Departmental organization and administration.
   b. Medical records and biostatistics.
   c. Consultation and coordination in relation to employee services, welfare and benefits.
4. Education and research
   a. Employee health education.
   b. Departmental staff education.
   c. Medical-public relations.
   d. Research.

II. Curriculum of Graduate Education

1. Basic sciences
   a. Biostatistics.
   b. Epidemiologic technique.
   c. Environmental physiology.
   d. Industrial hygiene.
   e. Applied toxicology.
   f. Pathology of occupational disease.

g. Human engineering, including psycho-physiology.
h. Preventive medicine and public health.

2. Clinical training
   a. Diagnostic aspects of medical and surgical specialties as they relate to occupational medicine.
   b. Diagnosis and treatment of occupational diseases.
   c. Care of emergencies.
   d. Rehabilitation.
   e. Mental health.
3. Ancillary activities
   a. Medical and business administration, including budgets, interdepartmental relations, layout, personnel and public relations.
   b. Legal aspects, including compensation law and insurance systems.
   c. Community facilities and relations.
   d. Health education and industrial psychology.
   e. Engineering principles (mechanical, electrical, safety).
   f. Industrial processes and methods.
4. Research projects
5. Field training (one year)

   The purpose of this year is to put into practice, under supervision, that which has been learned in the previous two years. The trainee should have actual experience in the four areas of activity listed under scope, above, as these are carried on at the medical department, and should participate in the daily work of the department according to the principles described in the report of the Committee on Education and Certification of the American Academy of Occupational Medicine, dated December 1954.

III. Standards and Approval of Training Facilities

(Developed with the assistance of Dr. Edward Turner of the Council on Medical Education and Hospitals of the American Medical Association.)

The function of passing formal judgment upon the graduate training programs in occupational medicine is clearly that of the Council on Medical Education and Hospitals of the American Medical Association, in line with its general responsibility for the approval of residency programs of the medical specialties. It is likely that the normal practice in this regard will be as follows:

The council will rely upon the American Board of Preventive Medicine, and especially its component on occupational medicine, for a statement of training requirements in this field. Once such a statement has been developed, the council, in cooperation with the board, will carry on the necessary field activities of inspection and approval.

The council will look upon training programs as their composites rather than as their separate fractions. That is to say, the academic portion and the field portion of a total training program will be appraised together. The council will thus hold the university faculty responsible for the quality of field training.

There is in this no implication that a given university center and a given

field facility are to be invariably tied together in the training of a given physician. The field facility may receive for training physicians from any university training center that has been approved for training in occupational medicine. The situation here is, from the council's point of view, analogous to that of a university hospital which admits for residency training physicians who have had their earlier training elsewhere.

IV. Present Facilities for Graduate Training in Occupational Medicine

A. The present training centers, their qualities, and locations were discussed but they are not listed in this report.

B. Standards and approval mechanisms

The curriculum for graduate training should be provided only by a university because the university:

1. Is specifically designed and geared for teaching.
2. Provides diversification of discipline and teaching facilities.
3. Is concerned primarily with the teaching of principles rather than practice.
4. Has available the required ancillary departments and source material.
5. Can assure the standardization of courses and the pursuit of knowledge according to some design.
6. Can give formal recognition to acquisition of knowledge.

C. Geographic location

For the purposes of the training herein described a university should be located as follows:

1. In an industrial area where there are adequate numbers of employed groups.
2. Where there are industrial medical departments that are available for the training program.

D. Administrative considerations

The training facility should be located in a university with a medical school or school of public health which will provide the required facilities, assume financial responsibility and appreciate fully the discipline of occupational medicine. In any case, the facilities of certain other schools and departments should be available:

1. Engineering.
2. Chemistry.
3. Law.
4. Business administration.

V. Present situation

A. The present supply of certified physicians in the field of occupational medicine will number between 150 and 200. It was agreed that under ideal circumstances, all physicians engaged in the full-time practice of occupational medicine should possess board qualifications.

B. The proper indoctrination of the student at the undergraduate level, the improvement of standards of practice of occupational medicine, and the extension of graduate training programs will provide the best inducements for recruitment.

C. The question of financial support was also discussed and it was agreed that during the years of academic training, financial support should be encouraged. It can be expected that the trainee will be remunerated during his in-plant year in accordance with his service to the industry.

Summation and Comment on Panel Report

Vernon W. Lippard, M.D.
Dean, Yale University School of Medicine

THE WORST JOB a man can be assigned at a conference is that of summarizing the summarizers. Had I known how effectively your chairmen and recorders would carry out their assignments, I would not have let myself in for it. The best I can offer are a few comments which reflect what one man has been thinking about during the past two days.

For the neophytes in this field of industrial medicine, this has been a most stimulating experience and I am sure I speak for the other deans and professors of medicine and surgery in telling the experts how deeply indebted we are to them for their wise counsel and the time and effort they have given to this conference. This is the way educational programs should be developed—through the combined efforts of the educators and men who have gained knowledge in the field through practical experience.

The task which Dr. Kehoe assigned to us in his opening remarks was to consider the adaptation of medicine to an industrial community. The magnitude of this challenge was impressed upon us by the other speakers. We were impressed with the fact that good industrial medicine, if properly developed, can improve the individual effectiveness and maintain the maximal industrial capacities, within their physical limitations, of some 65 million industrial workers and that this is the concern of both the employer and the employee. It also became apparent that good preventive medicine is not reaching the majority of workers—in fact, very few outside of the large corporations.

Even among the experts there seemed to be, at the beginning of the session, some disagreement as to just what constitutes industrial (or occupational) medicine. The best conclusions that I could draw independently were these:

1. That it involves at least the immediate care of traumatic injuries but that this aspect is of diminishing importance, particularly in the large industry, because of improved safety measures.

2. That it is always concerned with the prevention, and to varying degrees the treatment, of essentially occupational diseases but that their occurrence varies with the industry and they are practically absent in some.

3. That the prevention of nonoccupational illness should be of increasing concern because the effectiveness of the worker can be decreased just as completely by an emotional disturbance as by a broken leg. This involves greater attention to health education and counseling, periodic health examination and the practice of a good deal of what I like to call "preventive psychiatry," which is in the province of every physician—not just the psychiatrist.

4. That the industrial physician must give more attention to keeping people well. It is granted that in the present state of our ignorance, this is often a pious hope and differs from prevention of illness in philosophy more than in technique.

I should call to your particular attention the definitions and limitations of the scope of occupational medicine included in the report of Group D. Had this been available at the opening of the conference, much time would have been saved. This bears repetition.

"Occupational medicine is that branch of medicine which deals with the relationship of man to his occupation for the purpose of the prevention of disease and injury and the promotion of optimal health, productivity and social adjustment."

As I knew before we started, no single formula for education in the field, adaptable to all schools, has been developed. How the various schools may take advantage of the deliberations over the past two days will depend upon their locations, organizations and personnel. With this consideration in mind, let me comment briefly on the reports which you have just heard.

Undergraduate Education

I was glad to discover that no mention was made of the necessity for establishing a separate department for instruction in this field at the undergraduate level, although in those schools where a department or subdepartment has or will be organized for graduate or postgraduate instruction and research, its services will be useful. The general idea, with which I am heartily in agreement, seemed to be that our primary responsibility to the student is to make him more aware of the influence of industrial life on the health and well-being of his patients and to orient him concerning the role of the industrial physician in comprehensive medical management.

In many schools primary responsibility for this instruction will fall on the department of preventive medicine, although I believe it can be made most meaningful if there is participation of a man experienced in industrial

medicine. To have such a man give a few lectures only is, in my opinion, inadequate but I believe this method should not be neglected because it may provide the only means of introducing the student to the total concept. Of equal importance is the day to day contact in the wards and OPD with men who are vitally concerned.

Obviously, many of the elements of industrial medicine are found in the standard curriculum but are not labelled as such—for example, minor surgery, preventive medicine, a certain amount of toxicology and environmental physiology, and rehabilitation. Those elements which are lacking such as industrial hygiene, business administration, compensation law, industrial psychology and engineering principles belong at the graduate level just as do the more highly technical and specialized aspects of other medical and surgical specialties.

Postgraduate or Continuation Education

The basic problem this group had to face was the fact that no matter how good the watering trough, you have trouble in getting the horse to it and then in getting him to drink. Getting physicians in general to become acquainted with the problems of industrial medicine and sympathetic to them is a long-range problem. I feel confident that this problem will be solved within the next generation if the recommendations of the panel on undergraduate instructions are followed—I think they will be. Progress has been made in recent years, before this conference, and with increased recognition and respect for the specialty the young physician will grasp its significance just as he has the field of psychiatry over the past 10 years.

Education of the part-time industrial physician, who I understand is responsible for whatever occupational medicine may be available in the 99 per cent of industries employing under 500 people and to the 70 per cent of the workers employed in those industries, is a much more serious and more urgent problem. The community will not be willing to wait another generation for its solution. The worker in the small industry has just as much right to good occupational medicine as the worker in the large industry and he will demand it.

The mechanics and most of the skills necessary to institute effective continuation courses in this field are available in many medical schools but they will need the stimulation and assistance of experienced men. As to the precise arrangements and content of these courses, I have nothing to add to those mentioned in the report. Obviously, there can be no stereotyped method. It must be adjusted to the local situation and demand. The one caution I would emphasize is that attention be given to content rather than propaganda.

The third phase of this report deals with a temporary problem which I hope will not arouse too much panic, i.e., preparation of the several hundred physicians who may be eligible for board certification in the next few years. As has been true at the time of introduction of several other specialty boards, men already in the field, some well and many very inadequately trained and not covered in the grandfather clause, will clamor for certification. The

older and well established men in the category should probably be advised to forget it. For the younger ones, opportunities to fill gaps in their knowledge should be provided—not in cram courses covering the whole field in a month but rather in courses established or to be developed in special areas such as biostatistics, etc. which can be offered by departments of public health and industrial medicine. There is no easy channel for this group and if it should become too easy, the whole certification program will be cheapened. As has been the case in other fields, the period of eligibility for examination without formal graduate training will probably have to be limited.

Graduate Program

Examination of this report gives the uninitiated the best concept of what will probably be the future of industrial (or occupational) medicine. We see in it the proposed emphasis on such phases of preventive medicine as biostatistics and epidemiology, on such bridges between medicine and the social sciences and engineering as the study of community facilities and resources, legal and insurance problems, industrial psychology and human engineering; also areas of medical science not mastered by the average physician such as applied toxicology and environmental physiology. Certainly such a program will provide the industrial physician with a collection of special knowledge and skills to meet the challenges of industry not possessed by the men in other fields of medicine or any other profession.

There are two practical questions about the program which bother me. The first is as to where a sufficient number of men are to receive this training. There are perhaps a half dozen medical schools or combined medical schools and schools of public health in the country that could attempt to offer such a curriculum and some of them are so limited in staffs and facilities that they would have to limit admission to a very small number. From the standpoint of the university, this is an expensive program, even if all existing resources are utilized and even when they are existing, someone has to pay for them.

My second question relates to the cost to the student. After eight years of education at the university level, the physician entering any other specialty survives through about four more years of hospital training for his board, room and a stipend of from nothing to $150 per month but at least there is no further out-of-pocket expense. This program could not cost him less than $4,000 for the first two years, assuming that, as in the field of hospital administration, the industry to which he is apprenticed in the third year would pay him a modest stipend to cover living expenses. The promise of additional income in subsequent years to compensate for this added educational investment does not seem great. In summary, I foresee the need for subsidization of both the educational institution and the student.

Before closing, let me make one more point to emphasize the remark Dr. Goldstein made at the dinner last evening. If the community (and I include educational institutions and industry) is to support this program, it needs more than faith to justify that support. In curative medicine and surgery, the beneficial results can be readily substantiated. Preventive medicine of the

type envisaged in this program is still on trial. It is up to you to prove that it is as effective as we think it is.

Finally, let me take this opportunity to thank the staff of the National Fund for Medical Education for organizing this conference, the U. S. Steel Foundation for financing it, the Mellon Institute for housing it, and Dr. Homer Turner of the U. S. Steel Foundation for his personal interest and participation far beyond the call of duty.

PRE-SYMPOSIUM LUNCHEON

Webster Hall Hotel

December 8, 1955

Upon the conclusion of the panel reports, Mr. Colt entertained the panelists, the gentlemen scheduled to speak at the symposium, and a group of leading Pittsburgh corporation executives at a reception and luncheon.

REPORT ON A SYMPOSIUM

ON

MEDICAL EDUCATION AND INDUSTRY

HELD AT

THE MELLON INSTITUTE

PITTSBURGH, PA.

December 8, 1955

Following the conference and its concluding luncheon, leading corporation executives in the Pittsburgh area, members of the Allegheny County Medical Society and members of the Pittsburgh Personnel Association were invited to join the panelists at a Symposium on Medical Education and Industry.

Left to right: Stanley E. Dorst, M.D., dean, University of Cincinnati, College of Medicine; Dr. Joseph C. Hinsey, director, The New York Hospital-Cornell Medical Center; Edward L. Turner, M.D., secretary, Council on Medical Education and Hospitals, American Medical Association.

Left to right: William Seymour, senior vice president Liberty Mutual Insurance Co.; C. H. Hine, M.D. Medical Director, Shell Development Company and Leo Wade, M.D., Medical Director, Esso Standard Oil Co.

Left to right: S. Sloan Colt, Fund president, accepts a $100,000 check from Harry W. Anderson, vice president in charge of personnel, General Motors Corp. This represents GM's 1955 contribution to the Fund.

Left to right: S. Sloan Colt, Fund president; Gen. Matthew B. Ridgway, chairman, Mellon Institute; M. J. Rathbone, president, Standard Oil Company (N. J.); Clifford F. Hood, president, U. S. Steel Corporation; and Robert A. Moore, M.D., vice chancellor, Schools of the Health Professions, University of Pittsburgh, and 1955-56 president of the Association of American Medical Colleges.

Left to right: Norvin C. Kiefer, M.D., chief medical director, Equitable Life Assurance Society of the U. S.; Clinton S. Golden, former executive director, Trade Union Program, Graduate School of Business Adm., Harvard University and Dr. Edward R. Weidlein, president, Mellon Institute.

Left to right: Richard C. Wolmer, M.D., manager, Industrial Hygiene Foundation, Mellon Institute; Robert O'Conner, M.D., medical director, Liberty Mutual Insurance Company and Clifford F. Hood, president, U. S. Steel Corporation.

Symposium on
Medical Education and Industry
December 8, 1955

PRESIDING

S. Sloan Colt
President
National Fund for Medical Education

ADDRESS OF WELCOME

Gen. Matthew B. Ridgway
Chairman
Mellon Institute

Robert A. Moore, M.D.
President
Association of American
Medical Colleges . . . . . "Medicine Tomorrow"

Harry W. Anderson
Vice President in Charge of Personnel
General Motors Corporation . . . "Medicine and Manpower"

M. J. Rathbone
President
Standard Oil Company (New Jersey) . . "Our Debt to Medical Science"

Clifford F. Hood
President
United States Steel Corporation . . . . . "Industry's Stake in Rising Health Standards"

Opening Remarks

S. Sloan Colt

President, National Fund for Medical Education

THIS MEETING—a Symposium on Medical Education and Industry—is the concluding session of a three-day conference on the education of physicians for industry. It brought together outstanding medical educators and leading corporation medical directors to explore ways in which medical students—the doctors of tomorrow—can be better prepared for practice in an industrial society.

The participants met together in general session Tuesday morning. Thereafter they split up into panels and remained in close session Tuesday afternoon and all day Wednesday. This morning they met in another general session to discuss the findings of the panels.

This has been a most stimulating and fruitful conference—one from which I hope both medical education and industrial medicine will profit immeasurably in the years to come.

A full report on the conference will be sent to all medical schools and to the leading corporations in the country.

It is truly a cooperative venture. It was sponsored by the National Fund for Medical Education, the Association of American Medical Colleges and two councils of the American Medical Association: the Council on Industrial Health and the Council on Medical Education and Hospitals.

The expenses of this conference were generously underwritten by the United States Steel Foundation, Inc. Arrangements were made by a committee of medical directors and educators headed by Dr. Robert A. Kehoe, directee of medical directors and educators headed by Dr. Robert A. Kehoe, of the Kettering Institute at the University of Cincinnati College of Medicine.

Now in this final meeting we are turning to some of the broader issues involved in the promotion of better health and living standards. We have asked officials from three of the nation's leading corporations to share their views with us and we have asked the president of the Association of American Medical Colleges to speak for the nation's 81 medical schools.

First, however, I want to thank the Mellon Institute for its generosity in making its facilities available to this conference and symposium.

The Mellon Institute is an excellent example of one of the ways in which industry and medicine can work jointly for improvements in working conditions and in the industrial environment.

Its aims are similar to those of the National Fund for Medical Education. One of our aims, to be sure, is to mobilize new sources of financial support for the nation's 81 medical schools—chiefly from corporations. Another aim is to help bring about a better understanding and a closer working relationship between medical education and business corporations.

We believe strongly that if industry and medicine can learn to work more closely together, they can bring the benefits of medical science more readily to the American people. If by more active cooperation, we can help strengthen medical education, improve public health facilities, raise the standards of practice, expand plant health programs and foster health education for the workers and their families—if we can help bring these things about, we will have conferred a blessing on this nation second only to the attainment of world peace.

Progress is measured not only by new discoveries but also by the use to which they are put. It is not only important, therefore, that we uncover new health knowledge; it is equally important that we make the best possible use of it.

In a dynamic and increasingly complicated society such as ours, this requires the joint efforts of many segments of our population: the medical profession, business and industry and labor as well as our health departments, our schools and the press.

There is a growing realization of the economic and social importance of good health. Steadily rising health and living standards are essential to continuing prosperity. As Meyer Kestnbaum, one of the Fund's trustees and chairman of the Committee for Economic Development said not long ago, "Only in a completely healthy society will the arts and sciences be able to achieve their full potential, and man reap the full harvest of his knowledge and skills.

"To lay foundations for such a society is the *joint* responsibility of all of us: the businessman, the worker, the doctor, the teacher, and the political and civic leader."

Mr. Kestnbaum has thus expressed one of the guiding principles of the Fund. The medical schools are constantly making new knowledge available. To exploit its full potential, we must work together nationally as well as locally.

And now I wish to call on those gentlemen who have kindly joined us today at this Symposium.

ADDRESS OF WELCOME

Gen. Matthew B. Ridgway

Chairman

The Mellon Institute

General Matthew B. Ridgway welcomed the guests on behalf of The Mellon Institute and expressed his hope that meetings such as this would continue, since they would ultimately lead to a closer understanding between medical educators and industry.

(General Ridgway spoke extemporaneously and no transcript is available.)

Medicine Tomorrow

Robert A. Moore, M.D.

President, Association of American Medical Colleges

Vice Chancellor, Schools of the Health Professions, University of Pittsburgh

THE INDIVIDUAL who speaks about tomorrow in medicine is in the same class as the obstetrician who cannot escape his mistakes. After a diagnosis of pregnancy, the truth will come out in something less than nine months. Fortunately, few except in politics take the trouble after a decade to reread a paper, compare predictions and events, and call the attention of the author or prophet to his mistakes.

The problem of planning for the future is probably more pertinent in the field of education than in any other area of human endeavor. Fundamentally, education is designed to prepare young men and women to become worthy members of the society of the future. Hence, we must plan carefully so that we may not be charged with educating people for a world that does not or will not exist.

Similarly, when we think about and plan a program for a part of our civilization and our society such as medicine or better health care, we must consider how the program will be influenced by other segments of society, and how these other segments will have an impact on our program. Society is too complex and too interrelated today for any group or any program to isolate itself, and live and work in an ivory tower.

Therefore, let me turn first to some aspects of life in the world and in the United States today which have been, are, and will have or should have an influence on plans for education, research and care in the health area. It is difficult for me to arrange these in any order of importance or priority, and I ask you therefore not to attach significance to the order in which I discuss them.

One which certainly must be placed close to the top of the list is the industrialization of our society. America is almost unique among the countries of the world in the degree and types of industrialization. We are just beginning to receive the full impact of it on our life in terms of redevelopment of the downtown city, suburbanization of both businesses and homes, superhighways, to mention only a few.

Health care is involved in this readjustment in many different ways. First, a new specialty of medicine called variously, occupational health or industrial medicine has evolved. Physicians, nurses and others are taking special

educational programs to prepare them for service in this field. It is clear that universities must, in increasing numbers, organize formal and informal courses and those in universities must work in close liaison with industry. At the University of Pittsburgh, occupational health is one of the five major departments in the graduate school of public health and we propose to give every possible support to it in the coming years.

A second impact of industrialization on health care is in hospitalization. Our cities grew in the last century and first part of this century under a plan, conscious or not, of large hospitals in the main city. Since World War II, there have been great expansions and new construction of what are termed suburban hospitals. Here in Pittsburgh, as an example, several hundred new beds in the suburban area have been built. In one instance, there are plans for expansion within two years of the opening of a new suburban hospital. A few very rough figures taken from the reports of the American Medical Association may serve to point up the problem. In the decade between 1943 and 1953, the number of hospital beds in the city itself increased about 10 per cent, while the beds in the county outside the city increased almost 30 per cent, and in the surrounding counties of Western Pennsylvania by about 18 per cent. In the same period, the relative percentage of birth in hospitals of the total births in city and county increased by 3 per cent in suburban hospitals and decreased the same amount in the hospitals within the city. In other words, as people increasingly work and live in the suburbs, they naturally seek their health care there. It would appear that we have some planning to do to integrate the hospitalization programs.

A second major problem in the coordination of health care in a changing society relates to the increasing mass and complexity of scientific knowledge. The overall response to this has been specialization, in such areas as I have already mentioned occupational health. However, in many aspects, specialization in the health professions as well as in other fields, has lacked any type of unifying and coordinating force. Each profession and each specialty has formed in some degree, to use a colloquial American political expression, a pressure group. It is proper that in our way of life we should have pressure groups. Many advances in the satisfaction and abundance of life have come from pressure groups. But, from time to time, as each group moves forward by itself, we must also look at the whole and give emphasis to a unifying force.

Let me discuss, as an example, undergraduate medical education. As knowledge has increased, the length of the educational program has increased from a few years of preceptorship in the last century to not less than 13 years of post-high school education today for a specialist; and I believe soon every physician will be a specialist. The general practitioner today is a specialist. He differs from what are generally called specialists only in the breadth of his specialty.

The time has already passed when we can continue this process of adding years to education as knowledge increases, and this increase in knowledge is proceeding in a geometric progression. We must return to some fundamentals. In the undergraduate medical curriculum we must make it possible for

the student to learn that which should be known by all physicians. This must include the basic processes and facts upon which any type of future specialization and knowledge can be structured. For example, in the field of occupational health, industry will have better health care in the long run if we do not give separate and identifiable courses in occupational health to the undergraduate student, but rather that we strengthen the course in physiology to include experiments and seminars in basic environmental physiology; in the course in pharmacology, give basic facts about the types and effects of toxic agents; and in the clinics and ward rounds during the clinical years, bring out the relation of disease to environment—what has been called in England social medicine.

Whenever I discuss this problem of general versus special education in medicine, I recall a situation during the war. There were many suggestions that we should give courses in tropical medicine, in traumatic surgery, in treatment of mass casualties, and others. However, when the British were surrounded at Tobruk and evacuated the ill and injured by sea, it was announced that 85 per cent of those evacuated had the same diseases or injuries seen in civilian life. The student who has a firm grasp of respiratory physiology and respiration with an open chest, is equally capable of dealing with a penetrating war wound of the chest, a crushing industrial injury of the chest and a wound in an automobile accident in which the steering wheel penetrates the chest.

What I am attempting to say is that in the medicine of tomorrow, what we want in undergraduate medical education is not more specialization, but less specialization and more emphasis on fundamental processes and facts oriented to the problems of a changing society.

A third major factor in our modern society which is and will have an effect on health care is the changing age of our population and the concomitant change in the nature and needs of health care.

I need not belabor the point to you of the relative increase of older individuals in our population, because it concerns industry and every aspect of our society, as well as health care. However, let me cite just a few figures from a recent report of the Commission on Chronic Illness. About 60 per cent of the persons surveyed who were in their 60's had some chronic condition, while the figure was only 20 per cent of those in their 20's. The rate per 1,000 persons surveyed for arthritis and rheumatism was 14 for those 15 to 34 years old, 70 for those 35 to 64, and 223 for those over 65. The days spent in bed per person per year for a chronic disability, was about one or two days for those in their 20's and over five days for those in their 60's.

What do figures of this type mean to the medicine of tomorrow? As I see it, they mean many things. First, that medical education should be oriented, *not* specialized, to the problems and disease of the older person. Just as with industrialization, the courses in biochemistry and physiology may well enter into the basic changes in metabolism with aging. Thus, if the student understands the essentials of the action of drugs in the older person, he need not have a special course in the administration of anesthetics to patients over 70.

Second, I believe the changing age of our population means we must give greater emphasis to rehabilitation. To put it bluntly, we could reach a point at which there would be insufficient young working people to earn enough to support the older disabled and retired group. For this economic reason as well as humanitarian reasons, we should bend every effort to making every person a full member of our economic and social life. Most people are happier when they are productive and a needed part of society.

A third effect of the population on health care relates to the need for health care. If the demand for health care were level throughout life, the health professions could safely increase in number in direct relation to population. But, the older person becomes ill oftener and stays ill longer, so that every older individual added to the population almost doubles the need for physicians, nurses, hospital beds, and like items. Add this to another aspect of modern life—the greater utilization of hospitals—and we have a major problem for the medicine of tomorrow.

Let me cite just a few figures for Allegheny County, Pennsylvania. In 1943 there was a population of about 1,451,000, and there were 6,083 hospital beds, in hospitals registered by the American Medical Association. In 1953 the population was 1,542,000 an increase of 6.3 per cent, and there were 6,936 hospital beds, an increase of 14.0 per cent. The occupancy rate in these two years was 82.96 per cent and 82.62 per cent respectively. In other words, an 8 per cent greater increase in hospital beds than in population did not influence occupancy rate. In terms of hospital days this is about 150,000.

And, the end of these two trends—relative increase in older population, and greater utilization of hospitals—is not in sight. This is not the place to debate the question of how many physicians we would have or need, other than simply to express my personal opinion that we need and will need more. In the same breath, I want to say also that to accomplish this, we should not push the present schools to an enrollment which will endanger quality of education, but rather concentrate on new schools. In the belief that the public at large is not fully aware of what has been done by the schools in the last decade to help solve this problem, let me cite a few figures.

In 1945 there were 78 medical schools in the United States and they accepted 6,135 freshmen. In 1954, 10 years later, there were 81 schools which accepted 7,489, an increase of 1,354 or 22.1 per cent. At the moment, there are four more new medical schools being organized. In contrast with many other collegiate and professional courses, medicine has an extremely low drop-out rate. Of the 7,032 students in the class entering medical schools in the fall of 1949, 91 per cent had graduated by June 1954, five years later. We in the schools, think this is still low, and are devoting attention to better selection and better educational programs.

But, let me return to the broader problem of how to meet the increasing demands for health care. I believe one solution is emerging, that is, more, and a broader spectrum of health care on an ambulant basis. This should and can relieve the pressure on hospitals for admission and concentrate their special facilities on those who truly need them. If we are to have more ambulant care, we must organize for it. One reorientation which I see is the

bringing together of personnel and facilities for health care of the ambulant patient in the same way we have for the hospitalized patient—that is in clinics, organized and operated by the health professions themselves.

In close relation is another major problem of medicine tomorrow—the cost of health care. Any one of us who has paid bills for an extended illness in recent years could wax eloquently on this topic. I place the cost of health care as the principal topic, rather than health insurance, because I believe, the latter is one of the solutions of the problem, not a problem in itself. My suggestion that there be more care at the ambulant level, is another solution.

However, a solution to which we must apply ourselves most diligently is that of management engineering. Procedures and techniques of health care have for the most part evolved and not been planned. It is true that many procedures are professional and one cannot increase the efficiency of a professional treatment by a time and motion study. But there are many points at which we can attack the problem of costs and decrease them without change in quality. It has been done in industry, and can be done in health care.

The solution through insurance is basically sound, but we are far from a totally satisfactory basis. Presently available insurance has so many limitations and stipulations that it does not provide the protection needed against catastrophic illness. What we most need in my opinion is insurance against the top of the bill not the bottom, and with no exceptions. Most people can pay or budget for $100 or even $200 of health care but they cannot for $1,000 or $2,000.

The final point about medicine tomorrow which I wish to discuss is a change in viewpoint from disease to health, with particular reference to mental health. We have named our center here, the University of Pittsburgh Health Center rather than medical center to exemplify that viewpoint. The important thing to the individual is preservation of health, both physical and mental.

There must be an increasing emphasis on preventive services to everyone. In industry preventive programs in safety have lowered the accident rate and put money in the pockets of employees and employers. If the professional health schools through research and education can accomplish as much in prevention of physical and mental disease, the investment would pay off large dividends to the American people. I suspect that soon we may see a new specialty in practice of medicine—a physician to whom people go to preserve their health and prevent disease; just as today they go to surgeons and internists to cure them of disease.

In the area of mental health, our approach has changed from the insane asylum to the institutional care program. It is clear that there are not enough physicians, nurses and attendants, and money to keep on building and staffing more and more hospitals to institutionalize the mentally ill.

We must start investing in research to cure and prevent, and in training of men and women to help people, children and adults over the difficult spots in life such as in Child Guidance Clinics. A dollar invested in seeing

that a child becomes an integrated useful member of society will come back a thousand fold.

Thus, I come to the end of my attempt to portray, in a few minutes, what I see in the medicine of tomorrow. In this, I have tried to discuss the interplay between health care and the society and civilization in which it exists and functions. The points which seemed worthy of discussion were: Industrialization of our society, the increasing complexity of scientific knowledge, the changing age of the population, the cost of health care and the increasing importance of preventive services, particularly in mental health. There are probably others, but I shall have to leave them for another time.

Medicine and Manpower

H. W. Anderson

Vice President in Charge of Personnel, General Motors Corporation

IT IS A PLEASURE to participate in this significant meeting and to have the opportunity to speak on the subject "Medicine and Manpower."

Why this continuing and increasing concern on the part of management with the health of employees? We may say there is a legal responsibility to provide safe and healthful working conditions. We may also say that the good health of its employees is good business for the company. Many years of experience have shown this to be true. But certainly our concern goes beyond these considerations. It recognizes, above all, that the employee is an individual, with his own talents, problems, characteristics and attitudes—in many instances closely related to the state of his health.

The developing and broadening concept of industrial medicine is expressed by the very terminology we use. Years ago, the doctor in industry was listed under the title "chief surgeon." He did his work in a "plant hospital" or a "first-aid station." His job was to patch up the injured employee. Today, we employ "medical directors" and "industrial physicians." They do their work in "medical departments." Only a small part of their time is taken up with the treatment of employees who have been injured in plant accidents or who may be suffering from an occupational disease. This reflects the great progress made in industrial safety and industrial hygiene. It enables the industrial physician to devote the major portion of his time to the much more constructive field of preventive medicine.

Broad health maintenance programs are easy to outline. However, health is a very personal matter. The needs of the individual must receive prime consideration and we have tried to build our medical services around this concept.

It is basic in selective placement. We try to match the capacities of the individual to the requirements of the job to be filled. Our industrial physician makes a good preplacement physical examination of the new applicant. But if he is to be placed properly, more is needed than an appraisal of his health. The physician must know the demands of the job to which this particular employee is to be assigned. When he is assigned to a job whose demands are within the capacity of the individual, the first step of a good health maintenance program has been accomplished. It has been our experi-

ance that absenteeism and turnover can be materially reduced when we properly match these two basic factors.

Periodic examinations of established employees is the next step in a broad health maintenance program. Human beings as well as the materials placed in finished products are subject to stresses and strains. Knowledge of how each worker is reacting to the type of environment in which he has been placed is basic in protecting his good health. It is at this point that we begin to see the relationship between medicine in the company and that in the community.

During the various examinations conducted by the industrial physician he is afforded the opportunity of diagnosing nonoccupational diseases in their early stages. The responsibility of the industrial physician is one of fact-finding. Prompt referral to the private practitioner, whose responsibility is that of treatment, frequently brings under control a condition which might otherwise have gone undetected and resulted in a prolonged period of disability. Industrial medical department records are replete with examples of this. Early tuberculosis, diabetes, heart disease, cancer, gastro-intestinal disorders, are increasingly being recognized by means of these routine check-ups. Although the conditions may not be as acute, these examinations also bring referrals to the dentist and the ophthalmologist.

The employee is now in a much better position to take the steps necessary to the maintenance of his own health and that of his family. This is due to the broad coverage provided under benefit programs such as sickness and accident insurance, medical and surgical care, and hospitalization.

We believe the industrial physician also makes an important contribution to health education. Perhaps this is most effective when handled on an individual basis in direct contact with the employee regarding a health problem with which he or a member of his family is faced. Much also can be done through company publications. Our employees show an interest in the health articles published each month in *GM FOLKS* magazine. Booklets on health subjects have been among the most popular materials made available to employees through our Information Rack Service. Just as an indication of what this means, we have distributed 6,895,990 booklets on 35 health subjects since 1948. The interest of employees is such that we now must provide about 350,000 copies of each booklet we put in the racks. Employees take this material home to their families, and there is every evidence that it is a constructive influence toward better understanding of health problems.

We look upon community health as a team effort and our industrial physicians cooperate fully with the other physicians in the community toward this objective. We encourage plant visits by county medical societies as one means of promoting better understanding of common problems. Over the years these have proved to be quite effective.

We believe one of the challenging opportunities in the field of industrial medicine lies in research. Few doctors are offered the opportunity, enjoyed by the industrial physician, to observe a large and relatively stable group over an extended period of time. In addition the industrial physician has available quite complete records on personal histories and illnesses of em-

ployees. Furthermore the employee can be seen not only when he is ill but also when he is well and at work on his regular job. We encourage our industrial physicians to undertake research projects, and we believe there is an opportunity to do more in this field in the future.

The industrial physician makes a very important contribution to good employee relations. In impartial surveys made in our plants we have found repeatedly that the employees have reacted most favorably to the facilities of the medical department and to the services provided by the industrial physicians and the industrial nurses.

The doctors and nurses serve the employees in a professional capacity. We believe it is most important that this professional status be maintained at all times. The physical demands of a job; an employee's request for transfer from one type of work to another; a request for a sick leave of absence; the extent of disability; when to return to work after an illness —we believe all these questions should be evaluated from the viewpoint of a physician who is exercising his best professional judgment.

Once a decision has been made we do not believe the industrial physician should be drawn into any controversies which may ensue as a result of a union grievance. We think they should be handled by staff members experienced in union negotiations and collective bargaining. But it has been our experience that where the decisions are made on this professional basis there are few grievances; such decisions are respected by all parties concerned.

The evolution and development of our own health maintenance program is in itself a tribute to the fine work performed by our staff of some 160 industrial physicians. They have established themselves and the importance of their function through the countless evidences they have provided in terms of services to employees and in the value of their counsel to management.

I have indicated that a great deal is expected of our industrial physicians. As in any other field, adequately trained personnel is mandatory if success is to be attained. I know that in the past three days you have seriously discussed the best ways in which medical personnel may be trained to discharge these responsibilities. I will be most interested in reviewing your conclusions.

We believe there is much the medical schools can do, even in the undergraduate years, to give the student a better understanding of what is encompassed by this growing specialty—industrial medicine. A better understanding will be of great value to all young doctors—even to that great majority who do not choose this field but enter general practice or one of the other specialties. It will be of value because almost inevitably every doctor will be concerned with some of the inter-relationships which exist between the industrial physicians and other doctors in the community.

Specialization in industrial medicine as such comes in the postgraduate years. You may be familiar with General Motors' contribution in 1950 of $1,500,000 making possible the establishment of the Institute of Industrial Health at the University of Michigan. We have also recognized that much of the specialized training for young men entering this field is, after all, a

responsibility of industry itself. Accordingly, we have had in operation for several years a program equivalent to a one-year residency in industrial medicine. We now have some 15 medical directors who have completed this program. We add about five each year and would like to have more.

I have been discussing medicine and manpower from the point of view of the employer. You are also interested in manpower *for* medicine. You may recall that last January General Motors announced an expanded program of support for higher education under which 350 four-year scholarships are awarded each year to outstanding high school seniors with the student free to prepare for the career of his choice. The first group entered the colleges and universities this Fall, and 303 have indicated the field in which they wish to specialize. Those of you who represent the medical schools will be particularly interested in knowing that 30 are looking forward to careers in medicine. They are an outstanding group and will be knocking on your doors for admission about 1959.

There is great significance in the very meeting you are holding here today—bringing together representatives of the nation's medical schools and the corporations which, through the National Fund for Medical Education, are contributing to their support. In the final analysis, industry must depend upon the nation's medical schools for the personnel required to staff its industrial medical departments and carry on its broad health maintenance programs. These programs have long since proved themselves.

We believe that our industrial physicians make real and valuable contributions to the individual employee. Further than that, they have proved themselves to be an important asset in helping to maintain and strengthen sound and constructive relationships in our plants.

Our Debt to Medical Science

M. J. Rathbone

President, Standard Oil Company (New Jersey)

All America, of course, owes a tremendous debt to medical science. As individuals we could not live so long nor so well were it not for the progress made by the medical profession. Every group in our society has benefited from its advances.

American industry, which today provides the jobs, the material goods and services supporting our high living standards, is one important group whose achievements have been increased thanks to advances made in medical science. Operating under the same free enterprise system that fosters the medical profession, management in industry recognizes that these achievements—regardless of technological advances, even automation—are due primarily to the effectiveness with which each employee performs his job. Even though a few great men have succeeded in spite of physical or mental disability, it is quite obvious that the effectiveness of most people is directly proportionate to their health.

Those in public health and industrial medical service, in medical research, teaching and clinical practice who have aided in improving health and reducing disability thus have greatly increased our chances of being effective in our jobs.

Industry, however, acknowledges still another and more direct debt to the medical profession—one that goes beyond their services in developing vaccines to prevent disease, tests to recognize it, or drugs and operations to cure it.

We know, for example, that as a result of placement examinations given by our medical departments each employee will be assigned to work for which he is physically and temperamentally suited, and he will not become a hazard to himself or his fellow workers. We know our employees are protected by, and enjoy having, a healthy working environment. And we are also aware that health maintenance examinations and health education programs have helped to make our employees more efficient and productive, giving them a greater enjoyment of life and at the same time reducing industry's loss of time and money due to illness.

But perhaps most important, we recognize the value of our medical peo-

ple in a variety of areas not normally regarded as being related to medicine. At Standard Oil Company (New Jersey), for instance, we seek their advice as full-fledged staff counsellors on human and social problems. These include matters having to do with employee and public relations, employee benefit plans and retirement programs, medical aspects of techniques for the selection and development of supervisors and executives—in fact, in any area where they are qualified to give an opinion. In all of these activities, the confidential doctor-patient relationship is maintained.

We value the doctor's counsel as we do that of other staff members for the simple reason that his experience gives him a significant background of knowledge concerning the needs, moods, motivations and reactions of people. This reliance upon the doctor is in line with management's obligation to have available at policy-making and operating levels every aid that can help assure more effective employees.

As one illustration of Jersey Standard's indebtedness to medicine in general and to our own medical people in particular, the last 10 cases of active pulmonary tuberculosis among our employees were discovered by the company's medical department—and not one of the 10 cases had previously shown a single symptom of tuberculosis. Moreover, the incidence of this disease among Jersey employees is appreciably lower than it was just a few years ago. I realize, of course, that tuberculosis is on the decline throughout the United States due to improved methods of treatment. Still, we are glad to have in our company the calibre of medical service that finds such cases in time for the employee to have the greatest possible opportunity for prompt and complete recovery.

The petroleum industry is one where you might more readily expect this appreciation for the contributions of medical science. Almost of necessity it was a pioneer in industrial medicine. For it seems to be part of the stubborn nature of oil that it most often exists in remote places—in swamps and steaming jungles, in mountainous regions and in deserts—in short, in those areas throughout the world where the prevention, control and treatment of disease remain as major problems.

Jersey, for example, although a holding company, has affiliates which operate in more than 100 different countries. Carrying out its early exploration and producing activities over such a wide range of geography and climate, it faced difficulties which, though not so serious, were like those confronting the builders of the Panama Canal. It was in this period that the petroleum industry learned the need for having good doctors as well as good engineers. Had that lesson not been learned well, great quantities of one of man's most important sources of energy would have remained buried and useless.

Industry came to realize many years ago that an effective medical service was not limited to the handling of injuries, that its most exciting possibilities lay in steps that would prevent disease while maintaining and improving employee health—in other words, in the practice of preventive medicine. And, like other managements that have enjoyed the benefits of good medical staffs, we at Jersey are glad to acknowledge the extent to which we, our

employees, our owners and our customers are indebted to medical science.

I think you can see from this brief outline of the importance of industrial medicine that today's management relies heavily on the medical profession for advice and counsel in shaping personnel policies as well as in actual company operations. The fact is that each field of endeavor—whether it be the oil business, the steel business, the arts, government or education—is dependent on people, and it can prosper only to the degree that these people are capable, healthy human beings. The true measure of America's debt to medical science is amply reflected in the present prosperity and well-being of all its citizens—corporate or individual and in every walk of life.

Industry's Stake in Rising Health Standards

C. F. Hood

President, United States Steel Corporation

I SHOULD LIKE to say at the outset that it is a genuine pleasure to participate in this symposium and to express, on behalf of United States Steel, the deep concern we hold for employee health in industry. If American industry is to meet the challenge of greater economic and social achievements in the years ahead, it must be aware of the prospects that reside in industrial medicine. Of course, this starts with and includes the fundamental matter of adequate personnel, properly trained in America's medical colleges.

All of us at one time or another have been intrigued by the advent of complicated mechanical devices capable of performing miraculous tasks. There are so-called "mechanical brains" with electronic memories that compute mathematical problems which have baffled the human mind. There are industrial machines for example, which can take a piece of raw steel and cut, stamp, shape and weld it into a finished product with almost unbelievable accuracy.

When one considers complexity, however, all of us will agree that none of these devices compares with the highest developed of all organisms—the human body. My admiration for those who accept the responsibility of keeping it in operation is exceeded only by my professional amazement at this masterpiece of engineering design. It produces 180 million red blood cells a minute, utilizes 72,000 cubic feet of air every day and is sustained by a 10-ounce pump required to push four quarts of liquid through 100,000 miles of capillaries, arteries and veins.

Beyond this, I understand that there are almost 800 types of diseases which can affect its efficient operation. Add to this the mysterious and interlocking workings of the human mind—hopes, desires, fears, frustrations, pleasures and other motivations—and the challenge to keep the human body functioning reaches staggering proportions.

Tremendous strides have been made in the medical field since the time of Pasteur, Koch and Ehrlich. Perhaps Sir William Osler could foresee

what was to occur when he predicted that preventive medicine would be "the medicine of the future." And so it is, also, that farsighted members of American industry visualize the growing necessity of emphasizing health-centered rather than disease-centered medicine, and initiating preventive rather than curative medical programs in the industrial environment. We realize in industry that the general health of every member is of importance to his continued efficient performance, as well as to the realization of his personal aspirations on and off the job.

Industrial medicine, however, is just beyond the incubation stage. It was conceived as an essential part of industry's organized safety efforts. If safety had been its only objective, one could say that industrial medicine has served its purpose well. But more than this, the industrial physician can look with pride upon a relatively new branch of medicine which he helped to create and which looms before us now as a field of such importance that it has given rise to this series of conferences on the education of physicians for industry. Safety will always be of paramount importance. I am confident industrial medicine will continue to make its contribution to industrial safety efforts. However, I look forward to the time when industrial medicine will involve itself to a greater degree in a much broader range of application of medical skills and knowledge to the development and maintenance of an effective working force. In this way it can make an even greater contribution to the continuing success of the company.

One might say, therefore, that industry's objectives in medicine find their basis in the progress that has occurred in the past half century. Among the most significant contributions of this nation to the advancement of mankind as a whole is the work of the American medical profession, from educators to practitioners. I speak not only of the tremendous achievements of medical science, but also the role that has been played by our nation's physicians in improving sanitation, in raising health and nutrition standards among our people, and in leading the way toward better medical facilities.

It is against this backdrop that one can visualize the potential of industrial medicine. It seems imperative to me that if industry is to meet its responsibility to its employees, its owners and the public, it must consider industrial medicine as an instrument by which advances in medical science can be applied to our industrial needs. I believe you will agree that industry is not asking too much, moreover, when it seeks to meet these responsibilities with assurance that progress within industrial medicine will match ultimately the progress realized in medicine as a whole.

In a discussion as limited as this, it is impossible to cover a wide field but I should like to touch upon a few points nevertheless that to my way of thinking represent the type of industrial medicine we seek and need in industry. For example, more needs to be known about individual susceptibility to toxic conditions in certain industrial environments. The medical profession is aware of the increased understanding of chemical reactions within the body, such as biochemical changes in cancerous human tissues. You are aware, also, of the ability of medical science to induce or retard temporarily certain infirmities through the injection of chemical substances.

When I first received an inkling of these discoveries and the hope held for eventual progress in these areas, I naturally thought of them from the standpoint of an industrialist.

We in industry are presently and constantly confronted with the problem of changing practices, altering equipment or installing safeguards wherever toxic conditions are detected. This naturally creates psychological problems among personnel. It can retard production, affect customer relations and sometimes result in unexpected and exorbitant expense. It may well be, therefore, that as industrial medicine comes into full bloom, the knowledge of these chemical reactions will find application in reducing toxic response by changing the reaction capacity of the individuals to such hazards. While this may appear to be a rather extreme example, it is to my mind not inconceivable.

Going a step farther, greater awareness of the effect of early infectious diseases on adult life indicates that different, even radical, approaches may be forthcoming in such areas as safety and one's individual outlook toward his job and his fellow employees. Even such matters as diet, I am told, might have more influence on a man's mental processes and behavior than may now be realized. New knowledge of why such elements as copper, zinc, manganese and cobalt are required in minute quantities in the human body may aid in overcoming glandular and systemic disturbances.

The discovery that certain chemicals can produce profound personality changes, makes one wonder if certain emotional disturbances, negative attitudes, perhaps even accident proneness, may not in the future be approached by chemical or physiological methods, rather than continuing to fall entirely in the realm of the psychological.

Industrial management itself already has adopted numerous preventive measures which might be the groundwork for what remains to be done. I have in mind such matters as valid psychological measurement of an individual's capacity for leadership. In United States Steel, we also endeavor to meet our problems in what might be termed their "preclinical" stage, through the elimination of hazardous materials where practical, and the effective control of dust, fumes, gases and other air contaminants by proper design of production equipment. Consideration of radiation producing devices, as another example, is accompanied by the establishment of control standards and specifications, as well as the training of plant personnel to assure adequate protection. These joint medical-management efforts, however, are merely a foundation for what remains to be done in the form of all-inclusive programs of preventive medicine in industry.

There is, of course, still another factor of industrial medicine which is important not only to business management, but to the physician and the medical educator as well. It is the matter of cost. It cannot be denied that industrial physicians, medical educators and management, and those forces that exert an influence from the outside, have tended at times to view the cost of industrial medicine emotionally rather than from a sound economic basis.

This aspect of industry has a positive and definite value. It deserves

budgetary treatment in the same manner as any other segment of business, whether it be production, sales, accounting or research. Somehow in some way, a yardstick must be developed to assay the value of industrial medicine in terms of what the medical profession is able to contribute to industry in the final analysis. I know that this cannot be measured as of the moment, but visualizing the culmination of what has been discussed in this series of conferences, I would say that its value should be substantial.

We are at the point where the precise nature, substance and depth of our industrial health problems are not fully known. This condition, however, must be faced by any science which endeavors to cross a new and challenging threshold. The medical profession is no doubt approaching problems in the practice of industrial medicine and training in medical colleges with the same searching eye the steel industry surveyed what were once thought to be insurmountable problems. For instance, we crossed a great number of metallurgical horizons during the past century due to a changing panorama of new industries. In 1900, the temperature of steam was considered a radical heat for steel, but the advent of electric power and the introduction of the turbine urged metallurgists to develop steels that now operate beyond a 1,000° Fahrenheit and at rotating speeds 1,000 miles per hour.

The 1930's marked the rapid growth of the appliance industry and the development of the all-steel automobile body. Again, steel industry scientists applied their knowledge toward the production of steels which could endure deep and severe draws in fabricating parts for the consumer trade. And so it has been on many occasions—steel for millions of hypodermic needles, steel for rocket engines and, at this moment, steel for man-made satellites beyond the earth's atmosphere.

In industry, we deal to a great extent with inanimate objects. In the medical profession, you deal exclusively with the animate. But in each instance, it is enterprise engineering, or the practical application of knowledge, which can achieve constantly rising standards of perfection. The task ahead, then, is to visualize both in medical training and practice the needs in industry and formulate such knowledge into new and effective programs.

It is said that our scientists hold the world in the palm of their hands, and while I for one believe that medical science contains a great force, industry needs from medicine assistance in preventing industrial injuries and occupational diseases and better methods of diagnosis and treatment. By the same token, industry needs the assistance of medical science to keep well people well; to keep able people able. In industry's terms that means keeping productive workers fully productive. And to some degree this can and is being done now. In the further development and application of this aspect of medical science lies your great challenge and our great interest.

Considering the potentialities of industrial medicine, properly integrated into the business scene, one might say that an entire new world of understanding of the human element in industry conceivably is within our grasp. It will be the job of the medical profession and medical education to move us closer to that new awareness. Like the ancient Roman diety, Janus, who

is familiar I know to the members of a profession that works daily with Latin, industrial medicine must be able to face simultaneously in two directions. It must look toward new horizons of medical progress and at the same time understand and be in harmony with the aims of industrial management.

Perhaps the key to what we seek together is contained in a statement by Goethe, the great author and philosopher of the 19th century. When approached by a German youth, who sought his autograph, together with some profound advice which would outlast time itself, Goethe took up the young man's album, paused momentarily and then wrote: "Let everyone sweep in front of his own door and the whole world will be clean . . . "